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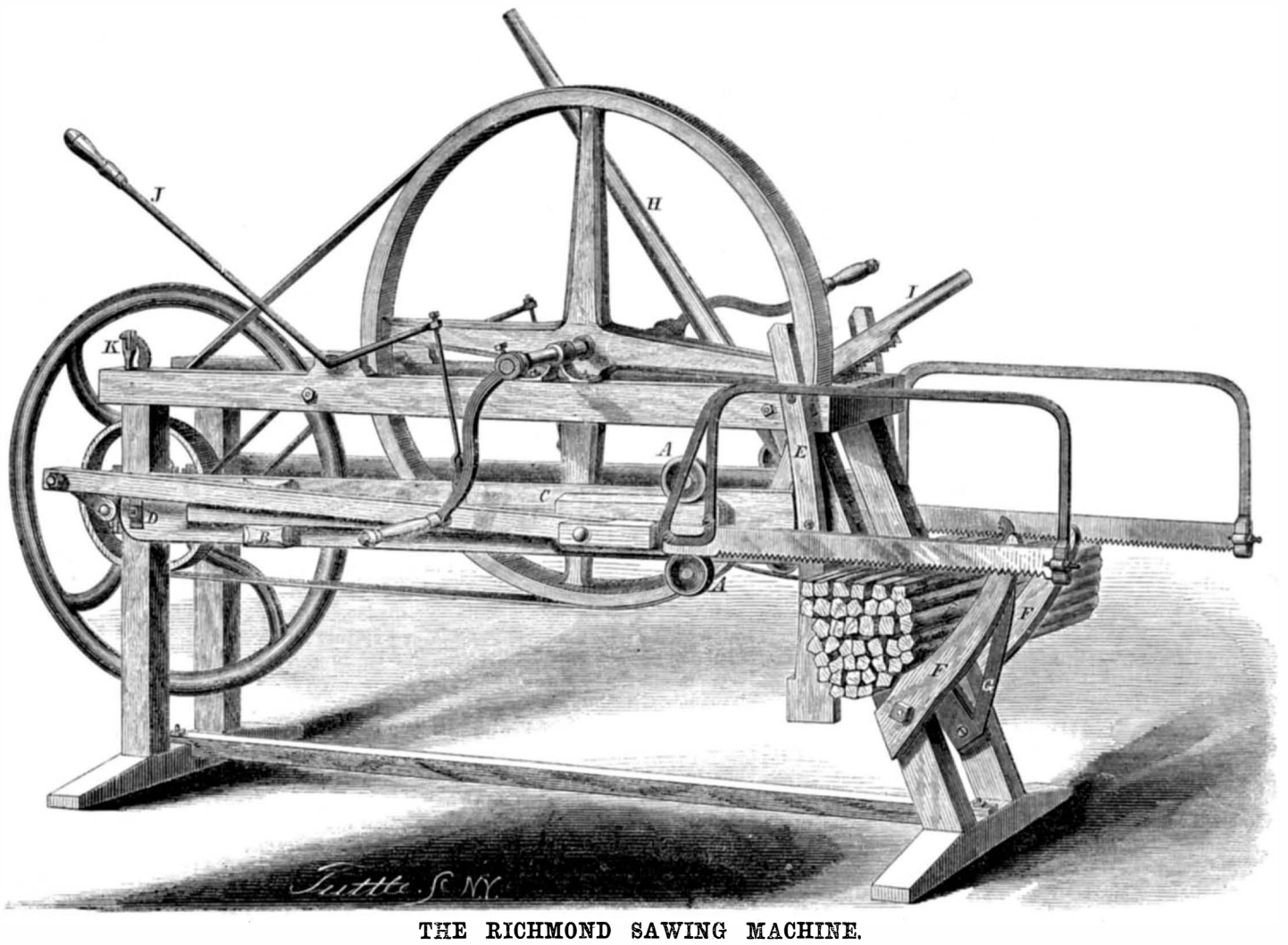
Improvement in Sawing Wood.

The buck and saw are undoubtedly useful implements for preparing fuel from wood, but it may be questioned whether they are favorite instruments for the development of muscle, even for those who are devoted to gymnastic exercises.

The machine represented in the annexed engraving is intended to take the place of the ordinary buck saw, and may be operated either by hand or by steam or horse power, one or both saws being run. Its general construction is easily understood, the machine being a frame mounting a driving wheel with cranks, a balance wheel, and the saws with the necessary connections. The power is applied to the center band wheel, which, by means of a belt, drives the crank shaft, with pulley and fly wheel, at one end of the frame. From the cranks on each end of this shaft connecting rods are attached to bars, the forward ends of which traverse between upper and under rollers, seen at A, and the other ends between guides, B. These sliding bars, with the rollers, guides, and the saws are all attached to the side pieces, C, which are pivoted at D, near the crank shaft, and the other ends of which can be raised or lowered, directed by the curved guides, E, which are bolted to the frame of the machine. This arrangement allows the saws to pass down through the log or bundle of sticks as they progress, while the relative positions of cranks, connections, and slides are unaltered.

The rear end of the frame is inclined from the top outward and furnished with two braces, F, inclined in the opposite direction to form a receptacle for the wood to be sawed. The inclined supports of the frame are furnished with spurs to secure the wood, and the log or pile is held securely by the jack, G, having teeth on its inner edge and operated by the lever, H, and the hold-fast, I. When the receptacle is to be loaded the saws with their appurtenances are raised by depressing the handle, J, which may be locked in position by the swing catch, K. The wood, being placed in position, is confined securely by the lever, H, and the jack, G, when the handle, J, is released, allowing the saw to come in contact with the wood. Nothing more is necessary then than to give motion to the saws by the crank handles, while the weight of the pivoted side piece, C, with its appurtenances, carries the saws through, its progress being stopped, when the saw has passed through, by the block on the bottom of the segmental guide, E. One side of the machine is a counterpart of the other, and one or both saws may be used at the same time.

It is claimed that this machine, although light, portable, and cheap, will, by the power of one man do four times the work in wood sawing in a given time than can be done by the buck and saw. It is especially suited to householders, farmers, and persons engaged in furnishing wood fuel for the market, as it may be used at the house, shop, or in the woods. It is the subject of a patent granted to F. J. Richmond through the Scientific American Patent Agency in 1864. Rights and machines for sale at the office and manufactory Nos. 56, 58, 60 and 62 West 13th street, New York. All communications addressed to Phyfe, Richmond & Co., as above, will receive attention.



THE RICHMOND SAWING MACHINE.

TRIAL TRIP OF THE BRISTOL.—This immense steamer which with her consort, the *Providence*, is intended for the new line between New York and Boston, made a trial trip on the 11th of June, carrying over twelve hundred guests. The hull was built by Wm. H. Webb, and the machinery and boilers by John Roach & Son, Ætna Iron Works, from designs by Erastus W. Smith, A. P. D. The vessel has a capacity of 3,000 tuns and the cylinder of the engine measures 110 inches. She is the largest steamer ever built for the Sound traffic. In our next we shall give a description of the vessel and her machinery.

Improvement in Attaching Window Shades.

As the inventor truly remarks, the exhibition of a bare roller of a curtain or shade detracts from the completeness of a sitting room or parlor, and there is no adequate reason why elegance cannot be combined with usefulness without drawing too heavily on purses already tested to their full extent. The device herewith illustrated appears to combine elegance with usefulness and convenience without heavy cost. It is easily described.

Fig. 1.

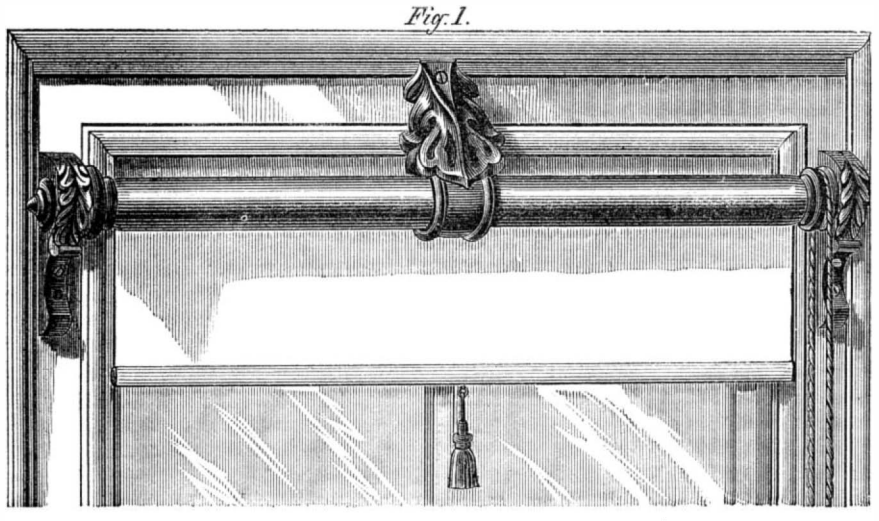
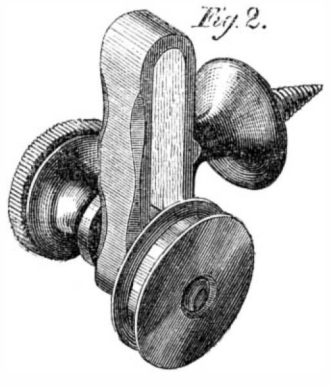


Fig. 2.



BROWN'S IMPROVED SHADE FIXTURES.

Fig. 1 shows the upper portion of a window with the fixtures and shades. The roller to which the shade is attached is concealed by a sheath, and differs from the ordinary roller only in being in two pieces, really a roller split longitudinally for the reception of the cloth of which the shade is composed. One of these longitudinal sections has a central recess running its whole length, into which fits a corresponding splinen or feather on the other half. This arrangement tends to hold the shade fast without tacking or other security. The ends of the split roller are secured by a button or disk, either screwed on or held in place by friction, both of the disks having studs which fit into the end brackets, forming axes for the roller, and one of them being a grooved pulley for the cord One of the supporting end brackets holds a spiral spring the tension of which retains the shade at any hight. The whole roller is covered with a double sheath of ornamental wood or metal, slotted to allow the fabric of the shade to pass through, and the ends at the center of the roller are supported by an ornamental suspended bracket enveloping the sheath, which is slotted on the under side to correspond with the slots in the sheath itself. All the exposed parts of this fixture are ornamented by carving if of wood, or by graceful designs if cast or stamped of metal. Fig. 2 is the lower cord pulley with its appurtenances. It has a tapering screw by which it may be seated at a convenient point in the window casing, and the pulley may be elevated or depressed in the slotted portion and held by the thumb nut.

The whole makes an elegant and sightly contrivance for the sitting room or parlor, and the sheath, when the shade is wound up, preserves it from sun and dust. Its cost is not great, slightly above the common plain fixtures, while it pleases the eye and yet performs its office. Patent pending on this device through the Scientific American Patent Agency, by Wm. Brown, West Cambridge, Mass., who will furnish any further information desired.

THE LIVINGSTONE SEARCH BOAT.—An exploring expedition is about to be dispatched by the British Government under command of Mr. Young of the royal yacht, and a portable sectional iron boat is building from designs by Chief Constructor Reed, of the navy. The sections will be two feet in length and not over 40 pounds weight, to be carried overland between the navigable lakes and water courses. The plates are one-sixteenth of an inch thick. The disputed question of Dr. Divingstone fate will at least be cleared up.

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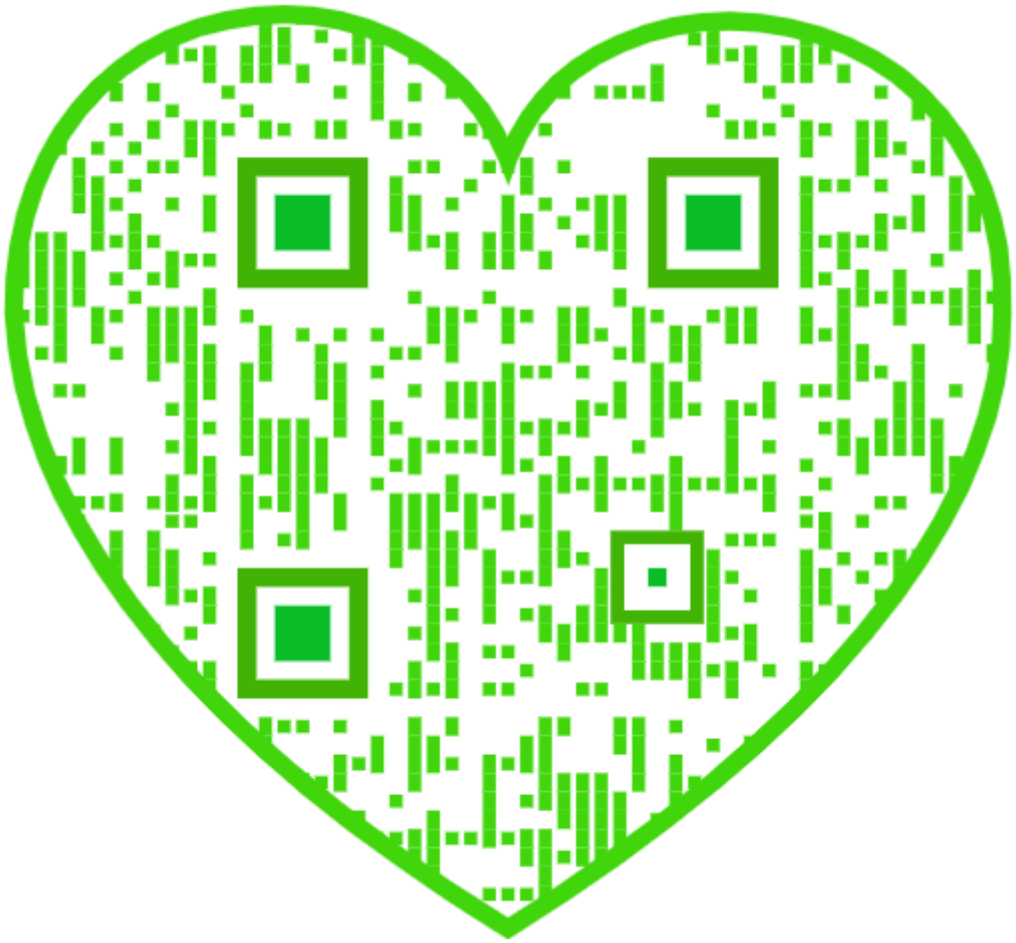


Special correspondence of the Scientific American.

LOCOMOTIVES IN THE EXPOSITION.

PARIS, May 16, 1867.

FOUR CYLINDER LOCOMOTIVE.

One of the most remarkable locomotives in the Exhibition is a twelve wheel coupled tank engine by Messrs. E. Gouin & Co. constructed for the Chemin de Fer du Nord. There are four cylinders of 17⅛ inches diameter 17½ inches stroke, two at the forward and two at the back end of the engine each driving three pairs of wheels. the connecting rods taking hold of the middle pair. The diameter of the wheels is 3 feet 6 inches and the length of the wheel base is 19 feet 9 inches. To facilitate the passage of the engine around curves, two thirds of an inch end play is allowed in the bearings of the extreme axles and the coupling rods are provided with a joint near the central crank pin admitting of a slight horizontal movement of the extreme axle instead of one adapted to vertical motion, as usually employed. Thecylinders, which are horizontal, are placed outside and have large flanges cast on them by means of which they are bolted to the frames. The two opposite frames are connected at the same point by transverse plates, which makes a stiff support for the cylinders. The steam chests are placed on top of the cylinders so that the valves are quite accessible, and this is rendered possible by the use of an outside valve gear, instead of by the use of a rock shaft as with us. The ordinary link motion is employed. The wheels are connected by compensating levers and the weight is very equally distributed on each pair, the total weight in working order being about 59 tuns. The center of the boiler is 7 feet 2 inches above the rails, and the firebox is made so shallow as to clear the tops of the wheels and is of such a width as to extend over them. This gives the large area of 33 square feet to the grates which permits the use of coal slack as fuel. Above the barrel of the boiler is placed a dryer or superheater of tubular construction, arranged as a return flue for the gases. The chimney is carried horizontally back from this to the back end of the boiler (the superheater not extending the full length of the latter) and then turns up just so as to give a vertical direction to the smoke and cinders. There are 275 tubes of $2\frac{3}{16}$ inches diameter in the boiler giving 1200 square feet of tube heating surface which with 107 square feet in the fire box and 414 square feet in the dryer and a feed water heater gives 1721 square feet for the total surface. The base of the chimney being near the center of the length of the boiler the exhaust steam has a long distance to travel before reaching the blast pipe. There are a number of these engines at work on the Chemin de Fer du Nord, and they of course haul very heavy trains, but I believe they are not very steady on the rails and it is doubtful if any more will be built. The pressure of steam used is 118 lbs.

ANOTHER REMARKABLE ENGINE.

Standing close by this is one for the Paris and Orleans railway, built at the company's shops at Ivory. It has ten coupled wheels of 3 feet 6 inches diameter, and a pair of outside cylinders of about 19¾ diameter by 24 inches stroke. The surface by which the cylinder is bolted to the frame plates appears ample, the latter being stiffened as in the previously mentioned engine. The most noticeable feature about this engine is that the two after axles are furnished with outside bearings, for the purpose I presume, of removing the axle boxes further from the fire box, and as the bearings are maintained of an ample width on these as on the other axles, and as of course an outside crank must be employed to receive the coupling rods, an extremely long crank pin is required in the driving wheel which is the center one of the five. This pin has three journals, the outer one of course being used for the coupling rod for the after pair of wheels with outside bearings, and the inner one is used for the coupling rod for the forward pair, the connecting rod taking hold of the middle bearing. Of course the strain of the after pair of wheels applied at such a distance from the wheel must be very severe on the crank pin. Still outside of this is an overhung crank for the eccentrics of the link motion, which is of the stationary link kind. The boiler is flush for its entire length and is covered entirely with sheet brass as are also the cylinders. Instead however, of this being done with taste as in our engines, it is full of corners and sharp depressions, as usual over here to adapt itself to the form of the casting, the consequence being that it can never be kept clean and will always look badly on that account. The use of the outside link motion enables the steam chest to be placed above the cylinder, the latter being horizontal and the former inclined. The piston rods work through stuffing boxes in the front head to sustain the weight of the pistons. A long tank extends on each side of the engine just over the wheels from the cylinders to the back of the foot plate except at a short distance from the front where a continuity is broken to allow access to the axles boxes of the forward wheels for oiling. This engine is intended for working an incline of 1 in 29.

ADJUSTMENT OF COUNTERWEIGHTS.

An engine with a steam tender, constructed at Graffenstaden for the Chemin de Fer del' Est, is also worthy of notice. The engine has six coupled wheels of 4 feet 8 inches diameter, and the tender also six of a less diameter. The bearings are outside, of good width and the connection is therefore effected by means of overhung cranks, which, by the way, look very heavy for the size of the coupling rods employed, especially those on the axles of the tender. The cylinders for both the tender and engine are placed inside and inclined, and appear to be well fastened to the frames. The diameter of the main pair of cylinders is 16½ inches and the stroke 2 feet. The wheel base of the engine is 12 feet 2 inches and the weight 36 tuns in working order, that of the tender with 1,760 gallons of water, being 26½ tuns. The counterweights on the driving wheels of this engine are arranged in a manner that shows an intelligent comprehension of the action of the moving parts. In an inside cylinder engine the center lines of the engines being situated at a considerable distance from the planes of the driving wheels it is evident that a weight situated in either of the latter, cannot counterbalance by momentum an opposite force acting in the direction of one of the former, as the tendency of two such forces would be to produce rotation around a point midway between them. By dividing the counterweight for each engine however, and placing one portion in one wheel and the other in the one situated on the opposite side of the center line, a perfect compensation may be effected. The weights must of course be divided in the inverse proportion of the distance of each wheel from the center line of the engine whose parts we wish to balance. The cranks of the two engines being situated at right angles to each other, we shall have in each wheel two counterweights of unequal size, the larger placed opposite to the crank of the nearer engine and the other at right angles to this, or opposite the crank of the further engine. These two weights may of course be replaced by one occupying a position between the two, determined by the relative magnitude of the original weights, by the ordinary method of the parallelogram of forces, the size of the single weight being fixed in the same manner. It will be seen that the position given to the weights in an inside cylinder engine will be considerably removed from directly opposite the cranks, and therefore an engine having the counterweights placed in the latter position as is generally the case, can not be properly counterbalanced. The same considerations apply to outside cylinder engines, but as in these the plane of the wheel is very close to that of the center line of the engine, the counterbalance of each engine may be almost perfectly effected by a weight in the nearer wheel.

REVERSING SCREW.

The two engines last mentioned are furnished with a screw for reversing, instead of the ordinary reversing lever. This arrangement, first introduced about 4 years ago by Ramsbottom, I believe is now very generally adopted, and I observe that most of the engines exhibited by Continental makers are provided with it. A projecting handle is in some cases applied to the hand wheel at the end of the screw, so that the wheel may be rapidly revolved in reversing. To enable the engine to be reversed in an emergency more quickly than is possible with the screw alone, the lever and screw are in some cases combined, and there are quite a number of engines in the exhibition having such a combined reversing gear varying in the details of its construction. In some, the catch of the ordinary lever is made to drop into the threads of the screw instead of into the notches on an arc, and for this purpose the screw is either made of a curved outline, large in the middle and small at the ends so that its upper surface shall correspond with the arc in which the lever moves; or the screw is fixed but at one end, and is free to vibrate as the lever moves so as to accommodate itself to its position. In others again, a divided nut is employed which is thrown out of gear by the same means that the catch is lifted when the lever alone is used; and this is arranged to slide up or down in a groove in the lever as the latter vibrates. The latter is the form used on the express engine, exhibited by the Paris and Orleans Railway with a few remarks on which I will conclude this letter. It has 4 coupled wheels 6 feet 7 inches diameter, and a single pair of leading wheels 4 feet 1 inch in diameter. The cylinders and firebox, as in so many engines, overhang the wheels, the total wheel base being 13 feet 2 inches. The two driving axle boxes on each side are connected by a stiff equalizing beam, and a single spring, placed at the center of its length transmits the weight of the engine to the wheels. The cylinders are outside and of 17 inches diameter by 25½ inches stroke.

SLADE.

The Electric Light.

The British Jovrnal of Photography thus describes the new electric machine of Professor Wheatstone:—

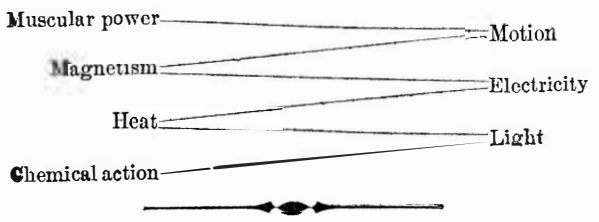
Our ideas of the electric light are almost invariably associated with the recollections of trouble and difficulty often experienced in the management of a large galvanic battery, with its accompanying fittings, acids, and fumes, detrimental alike to the clothes, hands, and olfactory organs of the operator. How different it would be if, instead of the cumberous paraphernalia we had but to turn a wheel, and lo! our sun would send forth his brilliant beams! This is not now a matter of mere theoretical speculation, but is really *un fait accompli.*

In the new machine no magnetism, no electricity, is required to commence the action. Nothing but motion is needed to convert a mass of iron and covered wire into a magazine of intense electric power.

The new machine consists essentially of a bar of iron bent in horseshoe fashion; around this is coiled covered wire, as in an ordinary electro-magnet. Between the poles revolves a spindle carrying covered wire, insulated, but so arranged that either end will be alternately brought into contact with each terminal of the wire surrounding the iron bar. Again: the spindle is so placed that, during its revolution on its long axis, it is made to present each side in succession to either limb of the horseshoe. The spindle is driven by an endless band, which passes around the circumference of a tolerably large flywheel. This is the general construction. When the spindle is rapidly revolved the horseshoe becomes magnetized, a powerful electric current being induced in the wire helix at the same time; and as the motion is continued, the forces go on acting and reacting until a very high degree of intensity is obtained. The electricity can be taken between two terminals placed in proper position. In this respect an important point of difference exists between Mr. Wilde's machine and Professor Wheatstone's inasmuch as in the former any body which we wish to submit to the action of the electric current must form the terminals of the complete circuit, whereas in the new apparatus the substance to be operated upon forms a bridge or short cut for the electricity, in order to complete the circuit.

The power of this apparatus is so great that, even when of small size and easily turned by the hand, it is capable of burning a piece of iron wire thirty inches long and one-sixteenth or more in diameter. In this experiment, at the moment of separation of the fused and glowing iron, the metal scintillates in a very beautiful manner. The same result is also obtained by approaching one terminal, consisting of iron wire, to the second end; the iron immediately takes fire and burns with brilliant coruscations. When the current is made to pass between charcoal points a beautiful and steady light can be obtained. This is the point which chiefly interests us, and we have little doubt that before long we shall have a machine which will be practicably available, and enable us to realize the idea conveyed in the term "turning on the sun" whenever we need additional light.

Finally, we have in the new machine a remarkable illustration of the co-relation of the forces—the muscular power of the human arm being ultimately converted into a brilliant light, as exhibited by the following chain:—



An Electrical Automaton.

There is one giant toy in the center of one of the avenues of the exposition, which as it cannot be classified or included with any other apparatus, may as well be described here. It is a large piece of imitation rock work, about twelve feet high, covered with rich vegetation, ferns and mosses, lichens and orchids; a spring gushes forth from one side, and feeds the pond in which it is placed, and in which gold and silver fish glitter and gambol. Peeping out of one of the cavernous openings at the bottom is a huge black and white Newfoundland dog of nature's size and nature's mold, but not of nature's life and blood. The attendant touches a secret spring, and while the admiring observer stays and stares, and feels inclined to pat Pompey's head, Pompey rolls his eyes, opens his mouth, and makes a very good imitation of the deep-mouthed welcome of some watch-dog's honest bark. Startled, but not intimidated, the observer raises his eyes and discovers carelessly sitting on a huge boulder, a hare, which immediately plays a wild tattoo on a drum placed before it, and, ere pussy ceases, a hideous and enormous baboon on one side clatters his jaws, rolls his eyes, scratches his head, and plays a wild and savage air upon a fiddle, while on the other side of the rock some pastoral swain, decked in gorgeous ribbons,

"Recubans sub tegmine fagi,"

bows his head, carefully peeps all around, raises a pipe, and brings forth strains that would melt Coryllis, who sits not far off, had she only life, and who probably, with other figures scattered about the rock. will continue to attract crowds of excited and amused observers of this strange medley of electric agency and skill, during the continuance of the Exhibition.—*Engineering.*

Meterology for May.

Prof. Loomis of Yale College, in his meterological report for the past month, after giving the mean temperature at New Haven as but one degree below the average, the amount of rain as one inch greater than the average, speaks of the unusual preponderance of cloudy weather, the average for the entire month showing that at 1, P. M. three-fourths of the sky was covered with clouds.

The lateness of the season in that locality, as indicated by the flowering of fruit trees has been very remarkable. Peach trees blosomed ten days and apple trees fifteen days later than usual. During a period of eighty-eight years only three other cases have occurred in which the flowering of apple trees was equally late. These facts seem to indicate that the time of blossoming of fruit trees depends not simply upon the amount of heat, but also upon the amount of sunshine.

In Europe we are informed the month of May was uncommonly warm, thus conforming to a rule which has been frequently observed in former years, viz., that the irregular fluctuations of temperature on the two sides of the Atlantic are in opposite directions.

ANOTHER STEEL PROCESS.—Mr. John Calvert, an English engineer, patents a mode of converting iron to steel, the chief peculiarity of which is the minute subdivision of the material by saws or other mechanical means while hot; allowing the particles to fall upon the hearth of a furnace in the presence of an excess of air and other gases such as may be appropriate for the purification of the particular iron under treatment. It is also to be magnetized by electricity or by friction from agitation: this being supposed requisite for producing the proper molecular structure and strength.

A NUMBER of Californians are organizing a company with $500,000 capital to buy up good lands to sell again to actual settlers, at long credits and low interest, together with seed, farm implements and live stock; manufacturers will also be encouraged.

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Editorial Summary.

MR. JAMES PARKER, a gentleman residing near London, has lately introduced a system of working engines by mixed steam and air, which he applied to the propulsion of a small road locomotive some time ago, and more recently for propelling a small vessel on the Thames. The results of these experiments were very satisfactory, and the subject has recently attracted no little attention.—*Exchange.*

[The above is a Yankee invention, quite old. It is the Cloud engine, invented by Wm. Mount Storms, and was publicly exhibited at the Crystal Palace, in this city and other places, ten or twelve years ago

AMERICAN GUNS.—One of Captain Ericsson's communications to the Government of his native country on naval improvements has been made public in Europe, and is highly instructive as to the merits of different systems of heavy gun making. The trial of the 20-inch guns at Fort Hamilton in March last, furnishes him with data for comparing the performance of these guns with the best English wrought iron rifled cannon. By the trials at Shoeburyness, the initial velocity of the 511-lbs. rifled shot from the 13½ inch Armstrong gun being 1,250 feet in a second, its actual force is computed equal to 12½ millions of foot pounds; since a body moving at a velocity of 1,250 feet per second has the force acquired by a body falling *in vacuo* 24,414 feet, or 24,414 times enough to raise its own weight one foot. On the other hand, the force of the 20-inch, 1080 lbs. shot, with the proved initial velocity of 1,400 feet, is computed by the same rule at 32½ millions of pounds. The area of the English elongated shot exposed to direct atmospheric resistance is 143 square inches, and that of the American spherical shot is 314 inches; considerably less difference against the American shot than the computed force shows in its favor, without charging to the English shot the friction of the atmosphere against its long sides. The worst of it is that this, by far their most powerful gun, has not yet been made reliable.

ELECTRO-CASTING.—Statues and other fine models in metal are made with microscopical exactitude in the fine-art foundery of Messrs. Elbington at Birmingham, by electro-casting *i. e.*, precipitating the metal from a state of solution upon the surface of the mold by electrical decomposition of its salts. In order to do this, the mold itself is first produced by the same process. The object to be copied is made impervious to moisture, and then coated with fine black lead. Placed in a copper solution, it is electrically coated with the metal to a sufficient thickness to retain its form when removed, and is then divided and taken off, or the model is removed from within. Its interior is, of course, a surface negatively identical with that of the model, and on being filled with a solution of bronze, and submitted to the battery, receives a deposit of bronze, the form of which is not to be distinguished from the original by the finest scrutiny. These casting are usually made one-fourth of an inch thick, but the thickness can be varied at will, requiring weeks or months, according to the thickness. Unlike other modes of casting, in this there is no imperfection from the distortion either of the mold or of the casting, nor from imperfect filling of the finest lines of the mold,

POWER OF INVENTION.—The last two great wars have illustrated in a new light the fact that one thought is mightier than a million arms. The inventor and the engineer fight the battles as well as do the work of the world. If there are exceptions and limitations to this statement at present, they are rapidly giving way before the advance of science, and the time is coming when they will be no more. We have only to suppose the inventor of the needle-gun to have been an Austrian or a "confederate" to perceive how the condition and future of either hemisphere might have been reversed through the agency of one man. Had the monitor sprung full-armed from a Southern instead of a Northern brain, where now would have been the United States? But there were reasons for these things as they were. Both Austria and the old South were narrow and non-progressive systems which could not breed invention, and would not honor the industrial arts. The future policy of nations is too plain to be missed by a plain man, however theorists may obscure it. Only those who most successfully cherish, most determinedly grasp, the whole system of arts and manufactures, will hereafter be strong or secure.

PAPER BOATS.—In an article last week on the applications of paper, we might have added, among its other uses, its substitution for leather, as machinery belting, a patent for which has just been granted, and its peculiar adaptability for the manufacture of shell boats for racing. A boat maker of Troy has lately constructed one thirty feet long, which weighs but forty pounds, and is in every respect superior to boats made of wood. It is thin, lighter than a wooden boat, is rendered impervious to water by a coating of oil and other compounds, and is claimed to be more durable, and that it will stand shocks that would destroy a wooden shell. Such a boat cannot be split or broken, but if a hole be made in it by accident, the perforation will be no larger than the size of the object piercing it, and could be easily mended; it will not swell nor crack, requires no caulking or pitching, and, above all, the cost is much less than a wooden boat.

MERCURIAL VAPORS.—M. Boussingault has laid before the French Academy of Sciences his researches into the effects and counteractions of the vapors of mercury, which destroy or reduce to imbecility and misery so many lives in certain branches of manufactures. The deadly influence of these vapors on plants, and the effect of sulphur in neutralizing them, had been carefully defined. Regnault considers the best reagent against the vapors of mercury to be an iodized daguerreotype plate, but Boussingault maintains that the sensibility of the plates is as nothing compared with that of plants.

PROFITS OF BEET SUGAR.—Mr. Grant's work on the beet sugar manufacture gives the following estimates of business on a capital of $200,000 in buildings and machinery, and $100,000 cash:—

Cost of 24,000 tuns of beets, at $4		$96,000
Cost of manufacturing		95,800
		$194,500
Returns—1,680 tuns of sugar, at 8 9-10 cents per lb	$336,000	
720 tuns molasses, at 4 cents per gallon	7,200	
4,800 tuns pulp for feed, at $2	9,600	
		352,800
Profit		$158,300

MISCELLANEOUS.—The importation of opium into the United States increased in twenty years, 1840 to 1860, from 24,000 lbs., or a pound for every 750 persons, to 110,500 lbs., or a pound for every 285 persons; the whole increase, at least, an unmixed evil.——Mr. Ridgway, the zoologist appointed to accompany the Government exploration of Russian America, has arrived in California. When on that coast before, he found birds nearly identical with living species in Asia, none of which are found on the eastern coast of America.——A committee of the English Parliament reports that at least one-third of all the fires in London are intentionally lighted for the purpose of defrauding insurance companies; mostly by "gangs of foreigners" who follow this as a business.——The *Colonist*, the oldest and most widely circulated journal in Vancouver Island and British Columbia, says that "nine out of every ten men in the Colony would welcome annexation to the United States." No Vancouver Island journal denies this. ——Germany has co-operative societies numbering 350,000 members, with yearly returns of large profits.——A number of Californians are organizing a company with $500,000 capital to buy and sell good lands to actual settlers at long credits, and low interest, together with seed, farm implements and live stock. Manufactures will also be encouraged.——The progress of France in fourteen years past (1851 to 1865), is illustrated by the increase of annual imports from $207,860,000 to $670,320,000, while the exports increased from $298,800,000 to $776,530,000, and the total commerce was nearly tripled; the clearances of shipping increased 50 per cent, the miles of railway were quadrupled (2,187 to 8,750), the miles of telegraph went from 1,875 up to 19,688, and the business of the Post Office and the bank of France were each multiplied more than five times.——Arbitration Boards between employers and workmen have been formed in the hosiery trades of Derby, Leicester and Nottingham, and are contemplated in the lace trade.——The *Great Eastern* has been seized under four warrants in as many actions, or claims for towing, supplies, and seamen's wages, the latter alone amounting to some $20,000, and the whole amount to nearly $40,000. The creditors who have recourse only to the assets of the Company, find them to amount to perhaps $150,000, while their liabilities are estimated not far from five times as much.——The largest topaz known was lately deposited in the Bank of France. It is from Brazil and measures 7¼ inches in length by 4⅜ inches in width and thickness, and weighs over 3½ lbs.——The British Admiralty have taken the (to them) novel step of addressing a circular to all the eminent shipbuilders and engineers of the country, asking for plans and estimates for iron-armored ships of war, embodying the best combination of improvements according to the judgment of the designer. Turret or other plans are invited, but not less than two turrets are deemed admissible.

BUSINESS AND MANUFACTURING ITEMS.

IRON.—Dublin (says *Engineering*), is the first British city, except London, that has taken steps to procure a second steam fire engine. In America, it would be hard to name a city, above fifth rate, that has not long since gone beyond its "second."——A Paris order per cable for ten Crompton looms has just been received at the works in Worcester.——The New York Watch Company is to adapt and occupy the works of the American Machine Company, at Springfield, Mass.

LEATHER.—Tanning with "hard hack" bark has been tried, with reported excellent success. The bark is steeped without boiling, and tans calfskins in three days, the leather being equal to the best imported, according to the *Shoe and Leather Reporter*.——The aniline dyes now enable the morocco manufacturers to give to their products almost all the variety and brilliancy of shades that are to be seen in any kind of dyed fabrics. Hence the growing fashion of fancy colors and decorations in ladies' shoes and other articles of leather——Paris is the greatest leather center of Europe, having the most varied assortments in all styles.——The suggestion has been broached to found a school of tanning, with the double object of educating competent hands for the convenience of manufacturers, and of bringing the art in this country up to the highest standards of Europe, and rendering us an independent and even a leading nation, as we ought to be, in this respect.——Sheffield's machine for quilting boot soles with wire, is to be manufactured at Hopkinton, Mass., by a new company with a capital of $500,000.

RAILROADS, ETC.—A pneumatic dispatch tube is proposed between Jersey City and Newark. The company are now raising capital under a charter granted by the Legislature of New Jersey.——Railroads carrying the mails are now required by the Post-office Department to prepay their mail matter over their own roads, the same as other parties.—— One of the telegraph companies proposes to take night despatches (handed in during the day) with twice to three times the number of words allowed by day for the same price.—— The highest average speed of English express trains is 40 miles an hour; ordinary trains, 18 to 30 miles; French express, 35 miles; ordinary, 16 to 25; Prussian, express, 29 miles; ordinary, 17 to 21; Austrian express, 29 miles; ordinary 14 to 21; Italian express, 30 miles; ordinary, 15 to 24.

MINING.—The Canada Gold Mines now number 73; the miners, 708. The yield of gold for the last three months is estimated at $690,955.——New diamond localities have lately been found in California. There are fifteen places in that State where diamonds have been found in washing for gold. ——The Missouri Mining Bureau has been organized with a capital of $2,000,000, for geological and mining surveys, opening and working mines and metallurgical establishments, erecting buildings and making and operating roads of all sorts, manufacturing, publishing a newspaper, and in short, doing anything in the world not inconsistent with the constitution and the laws of the State of Missouri.

MISCELLANEOUS.—The Northwest Manufacturing Company of Chicago have thrown their business into a co-operative concern, charging ten per cent on a capital of $100,000 for interest, insurance, and taxes, and on the other hand paying regular wages on the ten-hour system for work, and at the end of the year dividing the nett profits of the business equally with their workmen who sign the articles of association. The latter can invest their dividends as capital in the concern, if they see fit.——Female domestic labor in Colorado commands $40 to $50 a month, and is scarce at that.—— Wooden pavement men may profitably study the case of a creosoted sleeper recently taken up in Scotland after 21 years service as fresh and tough and smoky-smelling as ever. The original cost of the creosote used was ninety cents.——Some of the journeymen trunk makers of New York have taken steps to follow the example of the 25 printers and form a co-operative establishment.——The business of the Russian American Trading Company in ten years, from 1850 to 1860, is stated at $6,426,413 in receipts, and $1,017,000 in divided profits; the capital having been in 1833 about $2,000,000.—— The distillation of pine wood is carried on in New Orleans, realizing, as reported, from a cord of "fat" pine 40 gallons of turpentine, 1 barrel of rosin, 1 barrel of pitch, 100 gallons of pyroligneous acid and 50 bushels of charcoal; the whole worth $60 and costing $10.——There are in the State of New York 372 cheese factories which work up the milk of 168,166 cows. The other States and Canada are reported to the American Dairymen's Association as containing 114 factories and employing 53,927 cows, of which Ohio has nearly three-fourths, while New York has over three-fourths of the whole. ——The firing of the converted Snider-Enfield rifles by the 83d regiment at Gibraltar, proved very satisfactory, the independent firing sounding like one long, continuous volley.—— The preservation of milk in cans from which the air is expelled by heat, as in canning fruits, has been tried with success by a M. Malrun, who has received a prize of 1,500 francs therefor from the Academy of Sciences. The milk was found by the Committee quite fresh and sweet after six months preservation.——Hammonton, N. J. (says the *Culturist*), contains perhaps the largest breadth of land in one body set apart for small fruit, to be found in the United States. Within a space of say three miles square, nearly a thousand acres are devoted to strawberries for the New York and Philadelphia markets. Ten years ago, this great garden was a wilderness without inhabitants, and the first settler, Capt. Fay, was obliged to beg of the railroad company, as a favor, to stop a freight train there and let him throw off into the woods the materials for the first building.

CURRENT RECIPES.

TO PURIFY WATER, by a process promulgated by a Mr. Booth of Birmingham, put in it a neutral solution of bi-sulphate of alumina, in the proportion of one ounce to 435 gallons. The sulphuric acid of the sulphate decomposes the bicarbonate of lime in the water and forms an insoluble sulphate of lime instead. The hydrate of alumina being set free, forms with the organic matter in the water another insoluble compound. Both these fall to the bottom, and the remaining freed element, carbonic acid, lends an agreeable quality to the water.

A WHITE PASTE, adhesive to all surfaces, is said to be made as follows:—A solution of 2½ ounces gum arabic in two quarts warm water, is thickened to a paste with wheat flour; to this is added a solution of alum and sugar of lead, 720 grains each in water: the mixture is heated and stirred about to boil and is then cooled. It may be thimned, if necessary, with the gum solution.

COAL TAR is recommended in the *Chemical News* as an excellent coating of cisterns and reservoirs, to protect water from the lime and other salts contained in the cement. The tarry taste, if we may believe the writer, disappears in a few days.

PICKLING VEGETABLES, as well as salting meats and tanning leather, is effected without loss of time by the pneumatic process: exhausting the air and letting in the liquid under atmospheric pressure so as to force it instantly through the opened pores and cells.

PUTTY FOR STOVE JOINTS may be made by wetting together fine salt with double its bulk of fresh hard wood ashes. If a harder cement is wanted, use iron filings with white lead and linseed oil. It should have a day or two for hardening

TO CUT GLASS to any shape, without a diamond, hold it quite level under water, and with a pair of strong scissors clip it away by small bits from the edges.

A PUTTY of starch and chloride of zinc, hardens quickly and lasts for months, as a stopper of holes in metals.

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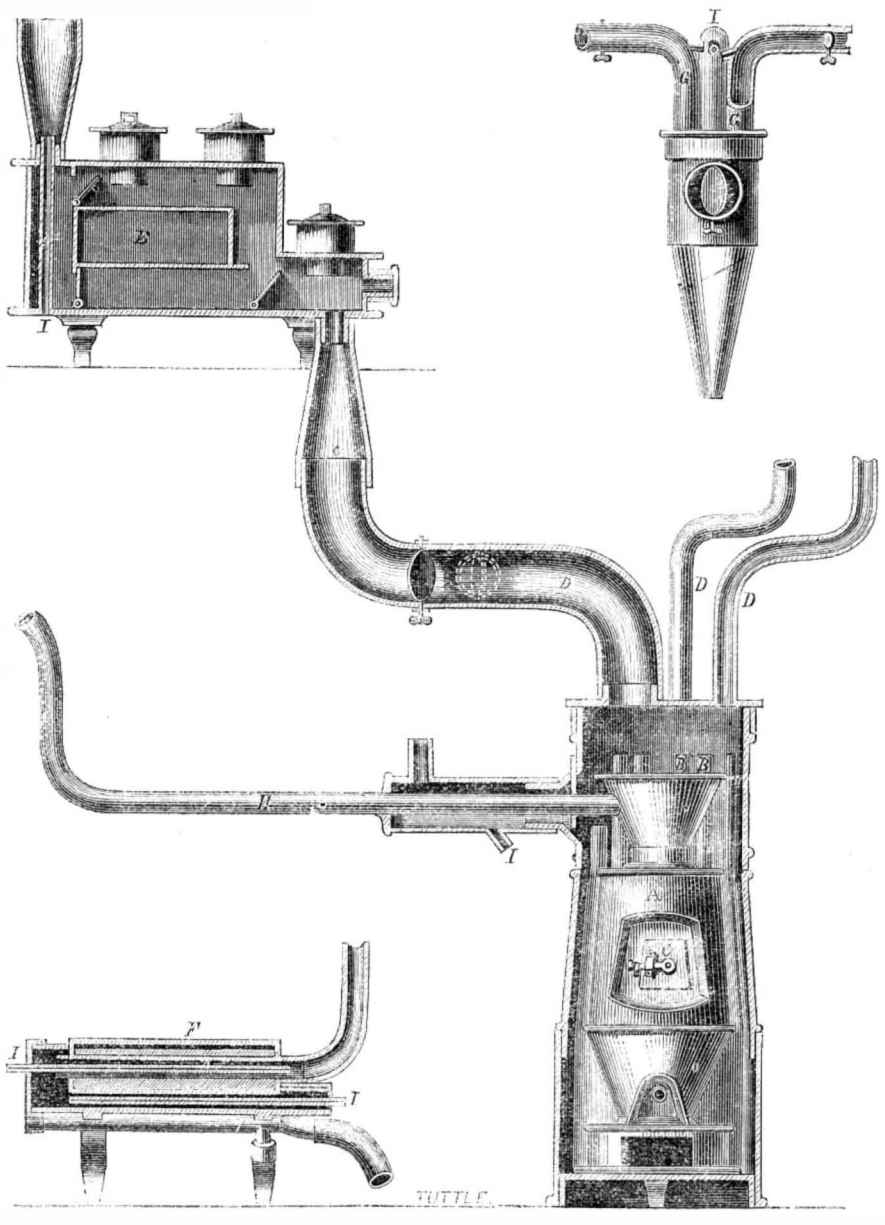
Improved Heating Furnace.

The engraving represents a furnace for heating apartments and for cooking purposes combined, which was patented through the Scientific American Patent Agency, Oct. 24, 1865. The invention consists in the use of separate tubes introduced into the heating chamber of the furnace, so that each apartment is supplied with heated air by independent pipes; in the employment of air tubes of comparatively small diameter passing from the external air to the interior of the heating pipes, and in the application of the heated air from the furnace to culinary purposes, after which it may be used for other purposes.



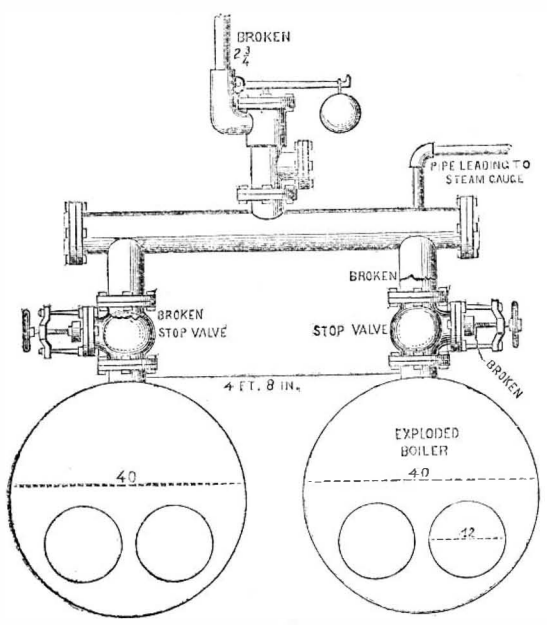
BENNETT'S APPARATUS FOR UTILIZING HEAT.

A, in the large figure, is the fire chamber of a furnace which rests on a bottom plate, into which are inserted tubes, B, surrounding the fire box. The furnace is supported on legs and the whole is inclosed by a drum which has a door to correspond with the door, C, and an opening for the admission of air below the fire box. The air thus admitted is divided, so that a portion of it passes into the space between the furnace and the outer drum, and another portion passes into the pipes, B. The pipes, D, conduct the heated air to different apartments or to a cooking stove, seen at E, on an upper floor, or to a baking oven or a boiler for heating water, designated by the letter, F. From either of these the heat may again be passed to other apartments by means of the funnel and pipes, G, which may be attached to the stove, oven, or boiler The pipe, H, attached to the inverted cone over the fire box conveys the smoke to the chimney flue. Small air pipes are introduced into the hot air flues and into the pipes of the boiler, F, having their outer ends extending into the external atmosphere. They are seen at I in the different figures. The object is to increase the combustion of the gases and the draft. Dampers are located at any points required to regulate the flow of the external air admitted or the heated air generated.

Further information may be obtained of Silas Bennett, the patentee, at Newcastle, Pa.

THE BOILER EXPLOSION IN PHILADELPHIA.

The ostensible facts in regard to the terrific boiler explosion which occurred in Sansom street, Philadelphia, on the 6th of June, are already familiar to our readers through the medium of the news journals. By this lamentable accident not less



than twenty-eight persons were killed and seven seriously wounded. Out of forty-three within the immediate limits of the disaster only eight escaped. One of two boilers exploded, when, according to the statement of the engineer, taken while in hospital, the steam gage showed only one pound of steam! The wonder at the discrepancy of this statement, even if allowed to be correct, with the fact of the explosion, will be greatly mitigated by an examination of the accompanying engraving taken from a diagram in the Philadelphia *Inquirer* and corrected by a sketch from a correspondent.

It seems that the two boilers were connected, as to their steam space, by a pipe, the connections of which with the boiler supported gates or stop-valves, by operating which either one or the other of the boilers might be used.

In No. 23, current Vol., we had an article under the head of "Boiler Feed Pipes, Check Valves, and Cast Iron Heads," in which we spoke against the practice of placing boilers in nests with improper connections. Our somewhat censorious remarks are supported by the facts, so far as we can gather them, in relation to this Philadelphia disaster.

It seems, by an examination of the engraving, that the only tests as to the condition of the pressure were placed at points entirely independent of the boilers; or that no test of the pressure on the boilers could be absolute, as the management of the gates was left to attendants. As one of our correspondents says, "there were two boilers set side by side, connected by a cast iron pipe, from the steam spaces near the front heads, with one safety valve and indicator gage, not in immediate connection with the boilers, but having gates, or stop-valves between the boilers and the steam pipe to which they were attached."

Certainly if only one of these gates was closed the indication on the steam gage would reflect the condition only of one boiler. Suppose both to be closed, as may be inferred from the statement of the engineer as given in one of the dailies, and the fact that only one pound of steam was shown is readily accounted for.

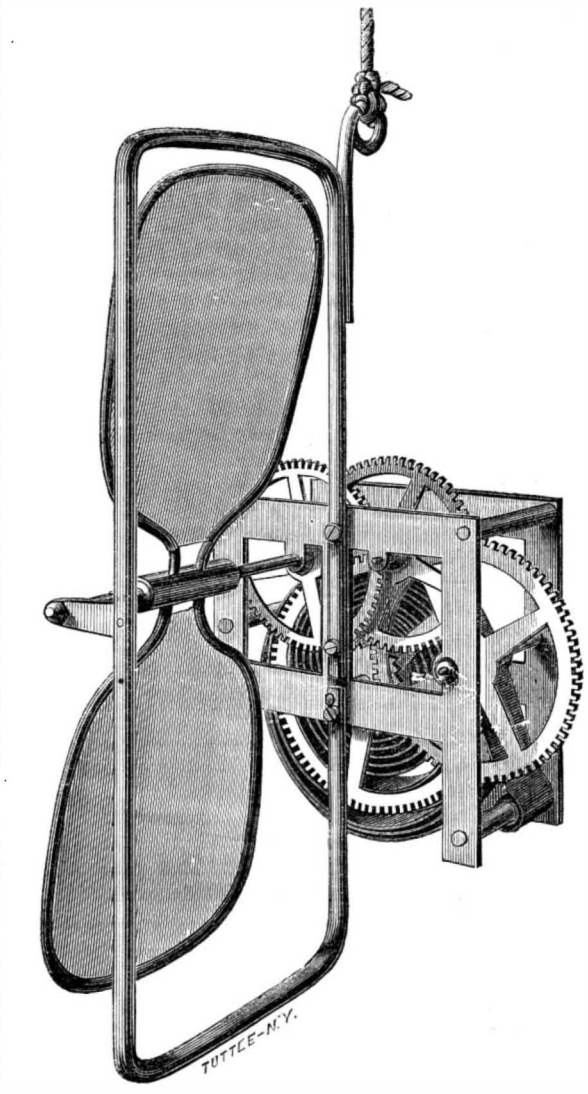
It is unnecessary to go further into this subject, as all mechanics will readily, from an examination of the engraving, be able to arrive at a correct opinion in regard to this latest lesson on boiler setting, on which subject we shall at no late day have a few remarks to make.

LUNDBORG'S IMPROVED AUTOMATIC FAN.

The object of this invention is to furnish a self-acting fan, to be suspended from the ceiling by a cord, over beds, dining-tables, surgical chairs, in theaters, public halls, mining tunnels etc., and consists in the fan attachment to clock or cog wheel movement, propelled either by one or more springs, or by weights.

The engraving sufficiently shows its construction and mode of operation. The fans, two or more, are suspended in a frame and driven by ordinary clock work. It can be used in almost any position or locality required; it can be raised or lowered at pleasure, so as not to obstruct the light if a person desires to read, or occupy space which could possibly be desired for other things. It will cause a continual current of air to pass directly over the head of a sleeper, without the danger of an open window draft. It will drive away musquitoes, and other insects, thus giving all the advantages without the oppressiveness of a musquito bar.

Over Surgical or Dental Chairs.—Being suspended directly over the head of the patient, it refreshes both him and the operator without being in the way of, or impeding the movements of either; Over Dining Tables.—Being suspended at various intervals, over the middle of long tables, a perfect draft will be created; flies will be dispersed, and useful space will not be occupied; In Parlors.—They can be suspended so as to be both ornamental and refreshing. Bouquet vases may be attached, thereby imparting the fragrance of flowers to the circulating air; In Dancing Halls and Theatres.—Large sized fans can be so distributed as to make the air circulate freely through the largest halls, without in the least obstructing the room; In Mining Tunnels.—Large sized fans propelled by



clock weights, can be so arranged as to create a perfect current of fresh air, dispelling all impurities.

In the Southern States, East and West Indies, Mexico, South America, and in fact, all hot climates, this invention must be useful.

It was patented Feb. 26, 1867, through the Scientific American Patent Agency, for J. A. W. Lundborg and Chas. W. Sanger of San Francisco, California. For further particulars or for exclusive right of manufacture, apply to Dr. Eugene F. Sanger, Bangor, Maine.

AN IMPROVED POCKET KNIFE.

One of the neatest and most convenient devices we have seen is an improvement in pocket knives recently patented through the Scientific American Patent Agency both in this country and Europe, by Mr. William Sausser of Hannibal, Marion Co., Mo. Instead of being secured to the handle in the usual way the shank of the blade has a curved or angular slot extending from the usual place of the rivet out through the edge of the shank on the side nearest the blade's edge. By means of this slot one blade can be removed instantly and replaced by another. To effect this removal where the back spring is quite stiff, the inventor has contrived a neat spring holder which takes the tension of the spring from the blade, or the shank of the blade may be so formed that the tension of the spring upon it when closed is very slight, and in that position it may be slipped out and another blade inserted.

This will prove an admirable contrivance for surgeons, gardeners, farmers, and others who require a number of different blades, as a handle of convenient size and form will serve the same purpose as one containing a number of fixed blades or as several separate knives. Its intrinsic utility will probably secure for it a very general adoption.

A WANT SUPPLIED.—In No. 24 current Vol. we published the expressed desire of a correspondent for an improved tobacco pouch. Since that was written we have seen and used a pouch that appears to be exactly what is wanted. It is a bag of any proper material having a mouthpiece with a projecting annular lip to engage with the pipe bowl, and inside is a rammer worked by a button or knob on the outside of the bottom. With this simple contrivance the smoker may load his pipe in a gale or in the dark without wasting a particle. It was patented Feb., 1867, and can be obtained of the agent, Wm. A. Hammer, 448 West street, New York.

THE Industrial Art Schools of France are to be imitated in England. A provisional committee was appointed and a subscription opened at a meeting of English gentlemen in Paris a few days since.

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THE WORKING GENTLEMAN.

The children of luxury and pride are not the only ones who need to be taught the dignity of labor. The sons of toil themselves do not always appreciate their work and station duly. We see this in various ways: sometimes in a jealous and envious aspect toward the rich, sometimes in a cringing and sometimes in a defiant attitude toward employers, and often in a sensitiveness with regard to their social position which is quite opposite to conscious dignity and genuine self-respect. False pride perhaps finds its deepest disguise often in the best working men, in a repugnance to the cultivation of taste and courtesy, as something out of caste and character for them.

In such sense as pride is permissible, a man should be unaffectedly proud of his industry, his usefulness and his self-denial, and placidly despise the gilded opposites of these, which men are prone to worship or to envy. He should realize that these qualities are so much more honorable than all others, that it makes no practical difference, in the comparison between men's stations, *what* their work is, so long as it is nobly done. Truly said the poet—

> Honor and shame from no condition rise:
> Act well your part: there, ALL the honor lies.

It is not, therefore, especially for the discipline of dainty coxcombs, who seldom come within our reach, that we reproduce the hearty lashing which the Charlottsville *Chronicle* administers to the young men of the South. It is good for false pride and effeminacy in all latitudes, whether swelling in broadcloths or fretting under denims.

"There is a vastdeal of idleness in the South. There are young men pretending to practice law or physic: young men instructing a half dozen pupils; young men selling a few yards of ribbon per day; young men who have no business there, at college: young men "farming," all of whom ought to be differently occupied. There are young men clerking it in hotels and banking companies where there is not full employment for them. There are young ladies by scores engaged in reading novels, or entertaining beaux. There are all sorts of agencies, ten thousand shifts to live, no matter how, so that it is not by manual labor. In a word, the market of head-work is glutted in the South, while the hammer, the plane, the trowel, the hoe, the ax, are crying for stalwart arms to grasp them.

"The idea is that a trade is not just the thing for a young man who considers himself as good as anybody. It is thought a better thing to be a jack leg lawyer, or to murder people with a doctor's diploma, or to weigh butter, than to build a house, or make a sewing machine, or construct a steam engine. The agent of somebody's vegetable pills is thought a more eligible match for your daughter than the man who prints a newspaper or a book. So it is a foolish and often fatal pride which makes thousands shrink from the mechanic arts; and those very men who, by a life of honest industry, have secured a high position in the community, and a respectable competence for their families, turn their backs upon their occupations, and trim their sons out for something that will not soil their white hands. We shall not prosper in the South until all these folks go to work, nor until labor with the hands is properly estimated."

THE MANUFACTURE OF STRAW GOODS IN THE UNITED STATES.

Thomas Coryat, the "Odcombian leg stretcher," as he was pleased to call himself, because of his extended pedestrian tours throughout Europe, in a narration of his travels published in 1611, states that "delicate strawen hats" were worn by men and women in some parts of Italy, particularly in the country around Piedmont. This is the earliest record we possess concerning the plaiting of straw, although undoubtedly practiced by the inhabitants of tropical climates for all ages. Indeed the first plaited goods made in this country were the work of the negroes brought over in the slave ships, who, it is related, of their own accord betook themselves to the manufacture of round hats from the inner lamina of the palmetto bark.

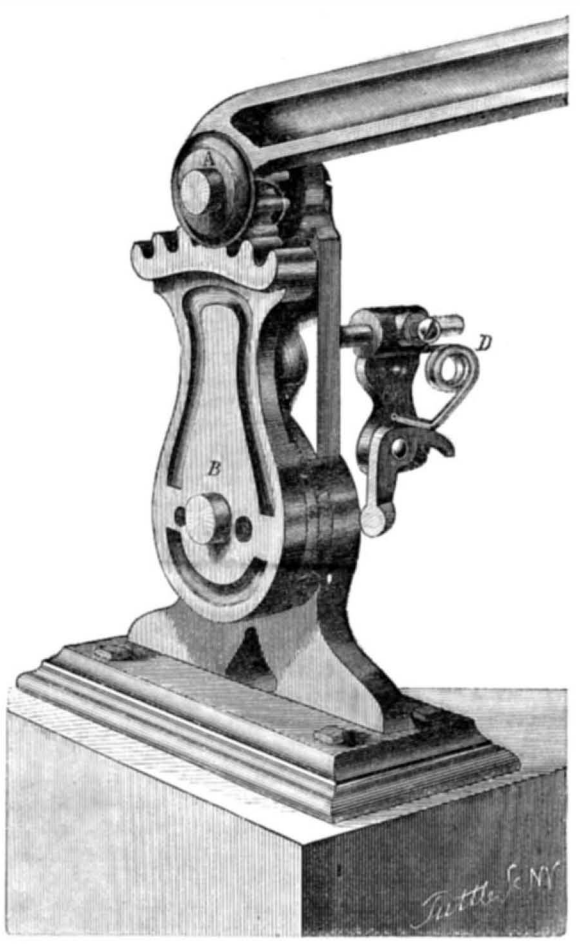
Hats and bonnets of Leghorn first became favorably known in England in the eighteenth century, and straw from that country was introduced with the Italian mode of working. Native grasses were also employed, although being much larger in size than the Italian, goods made from them had a clumsy appearance until the plan was adopted of splitting the straws. The neighborhood of Dunstable, England, for nearly a century enjoyed a wide celebrity for the excellent hats made from wheat grown on the chalky soil of that locality. It was one of these famed bonnets exposed for sale in a store in Providence, R. I., that in 1781 attracted the notice of Miss Betsey Metcalf and induced her, without instruction or any opportunity of unbraiding a plait, to attempt and successfully accomplish the task of making for herself a similar hat of oak straw, which she cut, smoothed and bleached in sulphur fumes. A *fac simile* of this bonnet is preserved by the Society for the Encouragement of Domestic Industry, and is regarded with the greatest interest as being the germ which has since developed into an extensive branch of industry. By the exertions of this lady the trade of straw working became quite common, especially in the New England states, and thence gradually extended throughout the country. In 1801 the first manufactory of straw goods was started in the town of Wrentham, Mass. This for many years continued to be the leading establishment in the country.

In consequence of heavy importations of common straw goods made by the cheap labor of the Irish, attention was turned to the closer imitation of the Leghorn hats, then so highly prized. The initiative in this matter was again taken by a lady residing in Weathersfield, Conn., who in 1821 laid before the London Society for the Encouragement of Arts and Manufactures a bonnet which the London dealers declared equalled in firmness and color the best imported Leghorn. The material employed was the culm or stalk of the indigenous spear, wire or meadow grass, a species of *poa*. Stimulated by success and the extravagant prices which were readily obtained for nice work, other native grasses were experimented upon, and new manufactories sprang up in all sections of the country. In 1840 the total value of straw bonnets and hats made in the United States was $1,476,500 According to the last census seven thousand hands were employed in the large manufactories of straw goods, turning out five million dollars worth of goods yearly. This is exclusive of the palm-leaf-hat manufacture, which would increase this sum nearly a million. The finer braids or plaits used in making up bonnets or hats, are still largely imported from Italy, Switzerland, China and Great Britain, and some of the coarser braids are brought from Canada. The annual valuation of hats and bonnets of Leghorn, straw, chip, grass and other vegetable materials thus imported is given by the authority before quoted as $1,603,239. New England, and particularly Massachusetts, is the section most interested in the straw manufacture, and through the country towns and villages great numbers of women and children find remunerative employment, who are not classed as operators in the figures given above. A later estimate gives the production of Massachusetts at 6,000,000 hats and bonnets annually. Philadelphia sends out goods of this class valued at over $600,000 every year.

LYON'S MACHINE FOR CUTTING STUBS.

The engraving shows a very handy machine which will be appreciated by blacksmiths, machinists, and iron fence makers. It is a contrivance for cutting "stubs" from the bar for the connections between the bars of iron fencing, and for cutting wire and small iron into convenient lengths for many purposes.

The stand of cast iron supports at the top a pinion, A, which is a portion of a hand lever, by working which motion



is given to the segmental plate, B, that swings on a stud. The inner face of this plate and that of the stand have hardened steel dies, beveled by their edges across their seats and their faces working in close contact. A hole on each side of the pivot of the plate, B, passing through plate, stand, and dies, receives the iron to be cut. The gage for length of the stubs is seen at C. It can be adjusted by a set screw or swung out of the way as may be desired. The lower part has a pivoted bell crank lever, one end of which forms the stop and the other engages with a spring, D, which holds it in place, and yet yields sufficiently, as the iron is fed in, to allow the stubs to drop as they are cut. The operation is readily comprehended. The iron is passed through the holes when the plate, B, is in an upright position, bringing the holes in the parts in line, and then an elevation or depression of the lever severs the rod, the action being analogous to that of a pair of shears. The machine is portable, or it can be secured to a bench for shop use. When the dies are dull it is an easy matter to remove and repair them.

It was patented through the Scientific American Patent Agency May 28, 1867, by Warren Lyon, whom address for other particulars, 25 Eighth Av., New York city.

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LABEL FOR PLANTS, SHRUBS, &C.—It is said that zinc plates written upon with a common lead pencil, forms an enduring label.

BRIQUETTES.

One of the best illustrations of the utilization of waste or valueless products to be seen at the Paris Exposition, is the collection of artificial fuels there exhibited. Belgium, France, and Austria, who have taken the lead in this matter, contribute as the results of their experience, samples and models of machinery for the manufacture, from hitherto useless substances, of a cheap and valuable fuel for industrial and domestic purposes.

The principle of making refuse combustible materials cohere by incorporating them with some adhesive substance, forming thereby a solid mass of artificial fuel, has been practiced by the Chinese and other nations for centuries, but the special interest of these samples lies in the employment of improved cementing materials. Although the particles of some kinds of bituminous coal will cohere when subjected to pressure at a slightly elevated temperature, forming a block of considerable strength, to stand rough handling in transportation, some cement must be found which will more firmly bind the coal particles together. Common clay was first used for this purpose, but being itself incombustible, the large amount of ash formed proved objectionable, and recourse was had to coal tar with excellent results. In the countries referred to above, where this kind of fuel, under the name of briquettes, or carbon agglomere, has been extensively experimented with, a residue in the manufacture of starch has been lately employed as a cement, a substance valueless for other purposes, and having advantages over clay in that it leaves no ash, and does not, like the coal tar, melt and thus lose part of its binding effect at a high temperature.

The form of the fuel depends upon the kind of machine used in compressing it. In M. Evartt's machine, which is very highly spoken of, the material is forced through iron tubes, so that the fuel has the appearance of a log of wood. M. Mazeline's appears to be constructed similarly to a model brick machine, the material being fed into prismatic molds and compressed by a square piston in each. While still damp, these blocks are placed in a kiln and warm currents of air are passed over them for the space of three hours, when they are ready for use.

Another machine exhibited is that of M. Dehaynin, being a modification of the one first mentioned. With its engine and all accessories a machine capable, with an eighty-horse motive power, of turning out ten tuns of fuel per hour—weighs sixty-five tuns. M. Dehaynin's works furnished 175,000 tuns of this fuel last year, which he sold to railroad companies, the navy, and a large quantity for household purposes. The samples sent by the Northern Railway Company of Austria, made at their coal mines at Ostraw, in Moravia, are prismatic in form, weigh about eight pounds each, and in actual practice on locomotives, are found to evaporate from 7·1 to 7·2 pounds of water per pound of fuel. The annual production from these works exceeds 170,000 tuns.

The saving of space in storage, from the compactness of this fuel, is in itself a great recommendation, the cost is trifling when compared with ordinary coal, while its convenient form, cleanliness, and high heating effect have given general satisfaction wherever it has been introduced.

Magnesium and Magnesium Lamps.

Some contrivance is much wanted to get rid of the copious though harmless, white smoke given off by burning magnesium. No apparatus for doing so, except the long expanding chimney already mentioned, has yet been introduced into the market. As the smoke is nothing but freshly calcined magnesia, which can be chemically altered by scarcely anything but acids, and is insensible to the action of the intensest heat, the problem is a difficult one. It is found in the present lamps, to very quickly coat the metallic sides of the chimneys, so that fixing a box with partitions above the chimney, smoke being made to take a circuitous route will encounter a very large surface on which much of it will be deposited, and the rest escape. Shallow dishes filled with weak sulphuric acid, placed on each of the interior shelves, would still further absorb the smoke. Mr. Larkin has tried many experiments to consume the smoke by causing it to roll over a large surface of felt soaked in weak acids and fixed in cylindrical chimneys. He has also exposed the smoke in the chimneys to slowly running or trickling streams of weak acids. In some of the experiments about seventy-five per cent of the smoke was abolished; still no apparatus has been introduced by anybody to practically and economically get rid of the smoke of burning magnesium. In one of the experiments made by Mr. Larkin he employed felt soaked in weak acetic acid, and was much surprised to see the smoke which did escape turn over the side of the chimney and fall down on the table, instead of rising to the ceiling as usual. He attributed the phenomenon to the partial decomposition of the volatile acetic acid into heavy carbonic acid gas, which fell over the edge of the top of the chimney and carried down smoke with it. Possibly, by following up the clue given by this experiment, a smoke consuming chimney can be made in which the smoke shall fall into a proper receptacle, now that it is proved to be possible to separate it from the upward flow of warm air.

Mr. Samuel Mellor, the manager of the Magnesium Metal Company, has made many experiments with the alloys of magnesium with zinc, tin, antimony, copper, thallium, lead and other metals. Some of the results obtained were curious. An alloy of lead and magnesium burned very slowly; an alloy of ten per cent of zinc and magnesium had a specific gravity considerably greater than that of the two metals when isolated; a fifty per cent alloy of zinc and magnesium was found to be more brittle than glass; an ingot half-an-inch in diameter, when allowed to fall upon a stone floor broke in pieces, and the fragments were easily pounded to dust in a

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mortar by hand. The alloys of magnesium with zinc are variably acted upon by acids, some of them dissolving with violent ebulition, and others in which the proportion of zinc is large, being nearly or quite insensible to their action. These alloys with zinc all burn readily, but the flame though brilliant, is not so rich in the lavender and extra violet rays of the spectrum as pure magnesium, so is not so well fitted for photographic operation, or other purposes where actinic rays are necessary. An alloy of fifty per cent of thallium and magnesium burns very steadily and slowly, but the magnesium flame is so brilliant that it completely masks the green flame of the thallium. Mr. Mellor has also recently discovered that a small proportion of thallium added to magnesium makes it very tough and pliable—a quality of some value, considering the ribbon and wire of unalloyed magnesium are so brittle.

Magnesium has recently been applied with the greatest success in pyrotechny. The powdered metal when covered with paraffine, is preserved from the action of acids and alkalies, and can safely be employed in the manufacture of fireworks. If only from two to five per cent of magnesium be mixed with the ordinary rocket powder the light is greatly intensified; and the effect was seen to great advantage in the recent pyrotechnical displays at the Crystal Palace. In rockets the dense white smoke produced by magnesium is an advantage rather than a loss; for the canopy then seen floating like a net work of snow-white gauze over each burning star, not only adds by its appearance to the beauty of the display, but reflects downward an additional amount of light. The use of the magnesium powder in rockets for signals at sea deserves the investigation of the authorities at Woolwich, as the light is so greatly intensified at so small a cost. The American Government is now seriously considering the desirability of adopting the magnesium light as their signal light for the service, both in lamps and out of them. At the Wimbledon meetings the light was employed with good effect, the magnesium balloons being generally mistaken by the public for meteors.—*British Journal of Photography,*

PETROLEUM FOR STEAMERS.

Calculations of the relative economy of coal and oil as fuel for ocean steamers, should take into account the important item of firemen and coal passers, their wages, weight and quarters, in addition to the difference in weight and space of furnaces and perhaps of boilers. In the recent experiments on board the *Palos*, at the Charlestown Navy Yard, it has been found that with three of her four boilers. and the attendance of three men, fifty per cent. more revolutions of the wheels were obtained than heretofore with coal under all four boilers, with the attendance of twenty men. But the greatest probable difference may be realized from a more perfect utilization of the force contained in the fuel. It is well known that as yet but a small per centage of the theoretical power of fuel has been obtained through steam. Coal heat is mostly applied by radiation. Oil, with proper apparatus, may be brought, in a state of combustion, mainly into direct contact with the boiler surface. How great a difference this may effect in practice, can be determined only by proper experiment. So that the question between coal and oil can not be ciphered out entirely from theoretical data.

In this experiment, petroleum was the oil supplied from two large iron tanks placed on deck, each tank having a glass gage at its side, to indicate the hight of the petroleum, and a vent pipe on the top to permit the escape of vapor. From these tanks the petroleum was conducted by half-inch pipe to the boiler furnaces, dropping into iron retorts, heated by burners placed beneath them, and being instantly vaporized. This vapor, in burning, was mixed with steam—decomposed by passing through pipes partially filled with iron filings, and with air forced in by a common air pump. The heat thus generated was intense; and the combustion so perfect that no smoke was perceptible. A diminution of the supply of air or steam at once created a smoke.

Commodore Rodgers, commandant at the yard, is so well satisfied with the three days' experiment, that he has determined to apply to the department at Washington for permission to make a trial trip at sea with the *Palos.*

Metropolitan Transit.

The New York city Three-Tier Railroad, having failed of a special charter, is to be built if possible under the general railroad law. The company, it is understood, have drawn up their plans and made preparations to apply to the courts to appoint commissioners of appraisal for the property to be taken, where not obtainable by private negotiation. Their proposed line runs from Canal street between Green and Wooster to the north rear of Bleecker street, there curving west to the west rear of Sixth Avenue, which it follows to Central Park, thence following 59th street to Ninth Avenue the line of which is followed to the Harlem river. The hope appears to be that the comparatively unimportant character of most of the buildings on this line, will permit negotiation to be successful. The buildings for the road are to be of four stories and substantially constructed, so that the running of the cars cannot create the least perceptible vibration. Steel rails will be used, and, by the use of a peculiar chair avoiding joints it has been demonstrated that a loaded car twenty miles an hour, will not make as much noise and jar as an ordinary omnibus. The cars, seating passengers, will be entirely of iron, propelled by compressed air, carried in reservoirs under the cars.

ELECTRICAL EFFECTS ON METALS.—Edlund has recently (1866) shown that the passage of a current through a wire, produces an expansion independent of that of heat. Ruhmkorff states that a bar of soft iron acquires hardness during contact with one of the poles of an artificial magnet.

EXPOSITION NOTES.

SEWING MACHINES.—In the English department there is nothing of novelty.—Among the French machines is one having an overstitch arrangement for the glove manufacture. It is a nearly exact imitation of the action of hand sewing, even to the tightening of the thread by a lever acting like the seamstress' little finger. The needle is threaded with the conventional needle-full, is placed in a needle holder which pushes it through the material, is grasped on the under side by another holder which pulls it through while the first lets go, and then returns it to the upper holder, passing it outside the material. Back-stitching might be effected in this way as perfectly as by hand, using a needle pointed at both ends, with the eye in the middle.—A crotchet embroidering machine is exhibited, in which the usual crochet chain-stitch is applied to pattern by means of a needle actuating a universal feed motion in all directions at the pleasure of the operator.—The American button hole machines and attachments are prominent objects of attention in this line.—Arrangements for a light motive power, by means of a head of water from the upper story, or otherwise and of electricity, are on exhibition. A very simple electrical motion is shown, consisting of a wheel on the driving shaft, with several projections on its edge and a deep groove in its center: in this groove is wound a coil, and on the shaft is placed a commutator, so that on revolving the several projections of the wheel are converted into electro-magnets. Revolving within a framework furnished with projecting plates of soft iron, the electro-magnets are attracted by the plates in succession, and motion is maintained. A Bunsen's battery of four elements, supplies the power.

CREUSOT PHILANTHROPHY.—Among Messrs. Schneider & Co's 10,000 workmen, 500 have within the last six years become proprietors of the comfortable model cottages erected by the firm. They form altogether quite a large town, of not less than 23,000 inhabitants, whose natural increase proves by statistics to be four times the average of France in general, the mortality of children being remarkably small. There is no poverty from sickness, accident or death, for the unfortunate are amply provided for by the provident fund to which all able to work pay 2½ per cent of their wages. The fund amounts now to $60,000, and there are also $50,000 of the workmen's wages in the savings bank. There is no magistrate, no lawyer, and no policeman in the community, and the number of crimes is less than the average proportion of the country at large.

BRONZED IRON from the Tucker manufacturing Company of Boston, attracts much notice from foreigners. It is prepared by oiling the surface very thinly, and then heating it in a stove at the temperature which ordinarily imparts a blue tint, so as just to decompose without charring the oil, at the same moment with the blue oxidation referred to. The oxide takes a brown color and a tenacious solidity from embodying the resinous element of the oil. The surface thus formed has the lustrous metallic appearance of bronze and great durability, and seems to be reproduced under the influence of the atmosphere, if correctly represented, in spots where it is worn away by attrition. The manufacture is to be introduced in France.

AN ENORMOUS BALLOON confined by a cable which unwinds from a drum, is to make hourly ascensions from the middle of the Exhibition, carrying up twenty or twenty-five persons to a hight of three or four hundred feet. It is to be supplied with hydrogen from the decomposition of water by red hot charcoal, at a cost not over $2,75 per 1,000 feet. The balloon is reported to be a perfect sphere of a diameter of 21 meters (nearly 70 feet!) composed of two very fine and close tissues cemented together with several coats of caoutchouc varnish and covered with linseed oil. It is calculated that the vast ascensional power will resist material deflection by the wind. The author of the scheme is Mr. Henry Giffard, the inventor of the injector.

A NEW GAS ENGINE, exhibited by Otto and Langen, has some interesting and possibly valuable peculiarities. The piston is shot upward through the length of the cylinder by the explosion at its foot, but does no work at this stroke, moving freely. The elastic pressure of the air against the vacuum thus formed, stops the piston gracefully, and sends it back with the whole force of the atmosphere pressure, added to the weight of the piston; this time gearing into a pinion and doing good service. The necessity of electricity or double lighting contrivances, together with the excessive heating of the cylinder by explosions at both ends, are obviated by this arrangement.

A WATER PURIFIER by Durenne, to remove carbonate of lime, consists of a tall, rectangular compartment or closet, furnished with a series of trays in the manner of shelves, from each of which, beginning at the top, the water is allowed to overflow in a thin film, falling upon the next below, the whole being constantly exposed to the action of waste steam from the engine. The heat volatilizes the carbonic acid and precipitates the lime in the trays, from which it is removed in solid slabs.

ANOTHER ICE MACHINE, produced by Carre, the maker of the ammonia freezer, produces cold by accelerating the evaporation of water in the presence of sulphuric acid in a vacuum, absorbing the heat of the water into vapor so rapidly that ice is formed in three or four minutes after the air pump begins to work.

A SAFETY SWITCH from London interlocks the levers which act upon the several switches and signals in such a manner that no one can be moved unless the others are in the position they should be in while that particular change takes place.

TANNING.—The report of the Committee on this department contains the somewhat unexpected conclusion that "with reference to the various processes claiming merits in their rapidity of tanning, no definite advantage has yet been found, and the period required remains about the same as before."

A DOUBLE CYLINDER, copperplate, printing machine, printing both sides of a continuous sheet in succession, is in operation on school copy books. The cylinders revolve in a trough of ink, which is scraped off for the impression of a "doctor." A Liverpool printing firm have purchased the English patent and introduced the machine there.

DENMARK exhibits ancient breech-loading cannon used 400 years ago, almost of the exact pattern of Krupp's—but probably not quite as good. Also revolvers of old time, not quite equal to Colts, but on the same general principie.

RUSSIA exhibits samples of manufactured cottons and woollens, and even silk goods from the borders of the Caspian Sea.

THE ENDLESS BAND SAW is applied to sawing boards and timber, with great economy of power and time.

WOODS (AMERICAN) MOWING MACHINE has won the first prize Gold Medal.

A SAFETY SWITCH has been tested and adopted on the Philadelphia & Reading Railroad, which bridges across the main rail without interrupting its continuity, and can operate to conduct a car from the main track only while pressed into its position by the switchman. A guide rail laid close inside the track, on the side toward the turn-out, is the only modification of the main track required. The outside switch rail is some four feet longer than the inside, and is slightly arched, so that when it is brought up snug against and level with the track rail, (the wheel being also pressed close to that side by the guide rail above mentioned) the tread of the wheel will cover it and ascend upon it. On reaching the hight of the arch, the wheel will be raised enough to clear the main track rail and pass over upon the turn-out rail. At the same time, the inside switch rail, which is pointed, and pressed into contact with the opposite main rail, receives the tread of the other wheel and guides it in a parallel course with the first. At the point where the inside switch rail in its turn must cross the main rail, another arch bridges over the main rail with a joint opening, and closing at the crossing point, unless the ordinary frog is there employed.

BREAD ASSOCIATIONS.—In no article is there more room for improvement and increased economy than in bread. As purchased from bakers or as made in kitchens, it is generally both poor and extravagantly expensive. In fifty families there may be one good bread, cake, and pie maker at command; and that one, with a single oven, could supply the fifty families much better and more cheaply than they can bake for themselves. A number of French families have demonstrated this by uniting in a co-operative society under the name of "L'Association des Consommateurs" (The Consumers' Association). They get their bread, of first-rate quality, at eight cents a pound: a reduction of full twenty per cent. from current prices.

CIGARS AT THE SEA SHORE—Every cigar maker knows the difficulty of keeping cigars dry on shipboard and of preserving the aroma of an ever-so-fine Havanna, on the sea coast. Travelers and sojourners at the sea shore who have been at their wit's end to devise a means to protect their cigars from the influence of salt air, will find a simple remedy in the use of a common glass fruit jar fitted with an air-tight metallic or glass stopper

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

EVAPORATOR.—Samuel M. Williams, Pine Village, Ind.—This invention has for its object to furnish an improved evaporator so constructed and arranged that the fire may be directed under either of the pans at pleasure, or may be shut off from either or all of the pans as may be desired.

WASHING MACHINE.—E. F. Wheeler, Sag Harbor, New York.—This invention has for its object to furnish an improved washing machine so constructed and arranged as to wash the clothes quickly and thoroughly and with a slight outlay of power.

ROAD SCRAPER.—N. Evinger, San Ford, Ind.—This invention has for its object to furnish an improved road scraper so constructed and arranged that it may be attached to and used in connection with an ordinary plow.

EVAPORATING PAN.—S. P. Dyer, Prairie Depot, Ohio.—This invention has for its object to furnish an improved evaporating pan for making sirup or sugar from cane juice sorghum juice, etc., and for making cider jelly so constructed and arranged that the various operations of evaporating skimming and finishing may be conveniently carried on at the same time.

FENCE.—E. C. Roberts, Salem, Mich.—This invention has for its object to furnish an improved straight rail fence so constructed that the rails and stakes will bind each other firmly securing the fence against wind or animals.

SLEIGH BRAKE.—William Sloan, Highland, Iowa—This invention is designed to furnish a neat, simple and convenient brake for attachment to sleighs.

NEW AND USEFUL ATTACHMENT FOR LANTERN LAMPS.—Jacob Silvins and Wm. T. Haine Sunbury, Pa.—This invention relates to certain new and useful attachments for the lamps of lanterns, whereby the wicks of the former may be adjusted, raised and lowered, and the wicks also deprived of any crust which may be upon them without removing the lamps from the lanterns. This invention therefore, it will be seen, admits of the wick of a lantern lamp being adjusted at any time, even out of doors in a strong wind without the least danger of having the light extinguished.

NEW AND IMPROVED METALLIC CLASP OR TIE FOR BAGS.—D. B. Baker, Rollersville, Ohio.—This invention is designed to supersede the cords, strings, and thongs now employed for tying bags. The invention consists of a metallic clasp composed of two semi-circular parts connected at one end by a link and secured around the bag by a hook on the opposite end of one part fitting in one half of a series of holes in the other part.

MACHINE FOR TEMPERING WIRE.—P. L. Slayton, New York City.—This invention relates to a new and improved machine for tempering wire, and is more especially designed for tempering wire braces for umbrellas and parasoles and straightening the same during the process of tempering.

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BALING PRESS.—J. C. Duvall, Sardis, Miss.—This invention relates to a new and improved baling press of that class designed more especially for farmers' and planters' use, for pressing and baling cotton, hay, hops, etc. etc., and to be operated by horse or mule power.

SUGAR EVAPORATOR.—W. C. Smith, Warrensburgh, Mo.—This invention relates to a new and improved sugar evaporator designed more especially for evaporating the sirup of northern canes and to admit of the work being done in a perfect manner by persons of ordinary ability.

BUTTON FASTENIN G.—J. R. Spooner, Lowell, Ohio.—The object of my in vention is to construct a fastening by means of which to attach buttons to clothes without sewing them to the clothes, and in such a manner that, while the button cannot be torn from the garment by force, it may yet be easily moved at any time for convenience in washing, etc.

DRAINING MACHINE.—A. P. Routt, Liberty Mills, Va.—The object of the present improvement is to provide means whereby a more steady and perfect operation of the plow is effected, and whereby the dirt is cleared away from the edges of the ditch to afford free access of water.

WATCH SAFETY POCKET.—R. M. Fisk, Olney, Ill.—This invention consists of a plate attached to the back band of the pantaloons, or other garment, with a hook protruding through a button hole into the pocket; upon this hook the watch is hung and secured thereon by a prong operated by a spring lever pivoted to the plate.

COMBINED PLANTER, CULTIVATOR AND ROLLER.—D. Duncan and E. R. Ridgeley, Olney, Ill.—The object of my invention is to construct a machine which shall be capable of being used as a planter, a cultivator, or a roller, or all together, and which while it is convenient to manage in the field, shall be strong and durable.

MEAT CUTTER.—D. S. Early, Hummelstown, Pa. Patent dated June 11, 1867.—The meat block is rotated on a vertical axis by the impulse of a pinion on the axis of the master wheel, the latter drives a pinion on the shaft provided with cams which lift the knives consecutively and release them to fall by their weight and the force of the spring upon the cutter block.

RICE CULTIVATOR.—G. W. Cooper, Ogeechee, Ga. Patent dated June 11, 1867.—In this invention three objects are attained; first the width of the plow is adjustable; second the manner of fastening the teeth impairs the strength of the beam less than in ordinary plows; third the shape of the teeth renders them less liable to break than are those of the common plow or cultivator.

BREECH LOADING FIRE ARMS.—Robert Errett Stephens, Owen Sound Canada. Patent dated June 11, 1867.—The invention consists of constructing a breech-loading fire arm which by the action of cocking throws open the breech and dislodges the shell of the exploded cartridge simultaneously.

COMBINED SEEDER AND FERTILIZER.—Ansell P. Routt, Liberty Mills, Va. Patent dated June 11, 1867.—The object of this invention is to construct a machine which will drop the fertilizing substance and the seed in the hill together in the proper manner, and which will be simple, cheap easily worked and not liable to get out of repair.

WEATHERSTRIP.—J. B. Wardwell, Georgetown, D. C. Patent dated June 11, 1867.—This strip is formed of a plate of india-rubber and with the springs bearing upon its upper surface is attached to a horizontal rotating shaft moved by the closing of the door, a stud on the door casing impinging upon a lug on the shaft.

BRICK PRESS.—Christopher Becker, Flint, Mich.—This invention relates to a machine in which two molds are alternately used for forming and pressing brick by hand-power, and consists in making three sides of each mold movable.

BUTTON HOLE CUTTER.—Hermann Hempel, New York City.—This invention relates to a new device for cutting button holes of different lengths, the improvement consists in having a sliding rest, which is adjusted under the knife, so as to make the same cut longer or shorter holes, and also in making the knife in one piece, whereby it cannot only be made cheaper, but also easier fastened in the jaw or arm to which it is secured.

BUTTON AND STUD FASTENER.—J. K. Underhill, Brooklyn, N. Y.—This invention relates to a device by which buttons, studs and other similar articles can be secured to garments, and consists in the use of two bent arms, of which one end is pivoted to the body of the button or stud while the end of the other is hinged in the center of the former arm. The first arm is made of a solid plate of metal while the second is a slotted plate, the outer end of the former passing through the slot in the latter.

FEATHER DRESSING MACHINE.—Alvah Washburn and J. N. Van Sickle, Medina, Ohio.—Patent dated June 11, 1867.—In this machine the feathers are treated with steam in a horizontal axis. The steam issues in jets into the feathers until they are sufficiently wetted, when it is shut off from the feather chamber, the ventilators are opened and the feathers are dried by the heat of the steam pipes. The novelty of the invention consists in the arrangements for the induction of steam and the eduction of the condensation from the steam pipes.

CULTIVATOR.—A. P. Routt, Liberty Mills, Va.—This invention relates to a cultivator having two strong iron beams, the rear extremities of which are bent downward so as to form curved shanks or sheaths to which the shares either of the shovel or plow kind, are attached by means of loops and keys and which are made to more securely retain the shovels or plows in any position in which they may be adjusted by having their extremities pointed and bent so as to enter small holes or notches which are formed in the back of each plow or shovel as hereinbefore explained.

WRENCH.—G. B. Keeler, Portchester, N. Y.—This wrench consists of a straight shank or bar, provided with a suitable handle at one end and a series of notches at the other, in combination with an adjustable spring hook, so hung to the said bar as to enable pipes of varying sizes to be grasped.

KEEL BLOCK.—Joseph T. Parlour, Brooklyn, N. Y.—This keel block is so constructed that without necessarily descending into the dock, or pumping the water therefrom, the several blocks, whether one or more, can be adjusted to the proper hights to accommodate the draft of the vessel whether large or small.

LINIMENT.—Madame Rachel Newcomb, South Brooklyn, N. Y.—This liniment is intended as a remedy for rheumatism and pains, as well as bruises and sprains of all descriptions.

WELL TUBES.—J. F. Craig, Eddyville, Iowa.—This invention consists in the attachment to the perforated sides of the well tube of a wire screen or gauze to prevent sand, dirt, etc., from entering the well tube through the perforations, and thus from being drawn up through the tube to the pump.

MANUFACTURE OF COUPLINGS FOR SHAFTS, ETC.—Leander Burns, Portchester, N. Y.—This invention consists in forming the couplings by striking or swaging them from a blank made of one solid piece of metal in a series of dies of proper form, to impart to the blank the shape of an ordinary shaft coupling.

NAPKIN HOLDER.—W. L. Dewey, Bridgeport, Conn.—This holder is extremely novel and most desirable for use, it being constructed with a ring or other suitable form for holding the napkin, and a base or pedestal to hold such ring above and away from the table.

MEDICAL COMPOUND.—H. G. Pope and H. F. Herrick, New Berlin, N. Y.—This compound is for the cure and removal of spavin and other similar complaints in horses.

GOVERNOR.—J. W. Shirley and William H. Fasig, Terre Haute, Ind.—This invention consists in imparting to a horizontal shaft a lateral motion by means of the resistance of the air upon the wings of a wind wheel.

COTTON GIN.—Jules Alfred Chaufourier, Paris, France.—This invention relates a to machine in which the cotton is fed to the rollers by the action of the machine itself, thus dispensing with the manual feed that was heretofore used for the purpose.

ROTARY DOUGH DRESSER.—C. H. Cross, Montpelier, Vt.—The object of this invention is to perform what is technically called by cracker bakers "dressing the dough," or brushing off the flour from the surface of the sheet of dough after it comes from the rollers on its way to the stamping machine to be cut up into crackers.

MNAUFACTURING STARCH.—J. J. Gilbert, Little Falls, N. Y.—This invention relates to a new and improved method of manufacturing starch, and to the particular manner in which the grain from which the starch is made is manipulated and operated upon during the process.

VELOCIPEDE SLED.—John Bannihr, Hempstead, N. Y.—The nature of this invention consists in connecting a hand-power mechanism with a sled for propelling it on ice as a velocipede, the movement being effected by levers worked by the person sitting in the sled, which operate on sharp-toed feet, placed in the side wheels, which catch in the ice to propel it forward.

COMBINATION SQUARE.—D. A. B. Bailey, St. Johnsbury, Vt.—This invention consists in attaching to the ordinary steel square a triangular-shaped frame made to slide upon the square, and to which is attached by a hinge at one end an adjustable face for the square, in such a manner that it is made to rest upon the square at any desired angle.

CHECKING THE DRAFT OF FURNACES.—J. C. Bagnall, St. Louis, Mo—This invention consists in admitting atmospheric air into the stack or chimney of puddling or reverberatory furnaces used in treating metalliferous ores by means of a door made in the stack or chimney above the reverberatory line of the furnace, in such a manner that the heat in the furnace can be regulated with the greatest accuracy, the inside brick work of the stack or chimney is saved, and the damper with its connection, generally used to regulate the draft, can be dispensed with.

POTATO PLANTER.—John P. Scudder, Lawrenceville, N. J.—This invention relates to a machine by which potatoes can be planted in furrows at suitable intervals, the machine being so arranged and constructed that the plow for making the furrow can be instantly raised out of the ground, and that the discharge of the potatoes can be instantly stopped whenever desired, for turning corners and other purposes.

COMBINED DIVAN AND BED.—Henry Buehler, New York City.—This invention consists in so constructing a divan or sofa that it can be opened or adjusted in its various parts to be used as a bed.

PRESERVING TIMBER.—H. L. Houghton, Morrison, Ill.—This invention consists in forming a composition (hereinafter described) by which I am enabled to render the softest and most worthless wood suitable for almost any purpose.

DISH.—E. L. Bolster, Waterbury, Conn.—This invention relates to a dish for holding stove polish, and the invention consists in combining with the dish a knife or blade so secured thereto that in drawing the cake of stove blacking across its cutting edge the blacking as it is cut will fall into the dish, from which it can be used in the ordinary manner. This dish is most convenient and desirable for housekeepers.

MONKEY WRENCH.—Dennis A. Kellogg, Valparaiso, Ind.—This invention relates to an improved plan of constructing a wrench for screw laps.

NIPPERS OR WIRE CUTTING PINCERS.—Peter Broadbooks, Batavia, N. Y.—This invention consists in an improved construction in cutting pincers, especially adapted to cutting wire.

STOP MOTION AND REGULATOR.—Charles S. Westland, Providence, R. I.—This invention relates to a method of stopping or slackening the motion of a pumping engine when from any cause the pressure has been suddenly removed.

JIGGING MACHINE.—William W. Spalding, Greenland, Mich.—This invention relates to improvements in jigging machines, and consists in novel arrangements and devices for washing the ores of copper, lead, silver, and other metals after they have been pulverized in a stamp mill, and separating the minerals or metals from the rock and earthy substances associated with them in the ore.

GRAIN ELEVATOR OR LIFTER.—William Marcus Jackson, Yolo, Cal.—This invention relates to a new and improved attachment to be applied to reapers for the purpose of elevating lodged grain and bringing it within the reach of the reel so that the latter can present it properly to the sickle.

COMPASS AND CAULKING SEAM GAGE.—Geo. Dowling, Hartford, Conn.—This invention refers to an implement which is intended to facilitate the operation of determining the width of a caulking seam throughout the whole length of a ship and which enables a ship's carpenter to make accurate work without being compelled to have recourse to his rule at short intervals or to trust to his eyes.

EXTENSION HORSE.—R. Hammill, Mineral Point, Wis.—This invention relates to a horse or trestle which is used by masons, plasterers and others for supporting scaffolds, etc., and it consists in so constructing the same that it can be raised or lowered, lengthened or shortened, and folded together as may be desired so that it will be adaptable for all purposes, and can be extended to the very largest dimensions.

COMBINED SAWING AND MORTISING.—Henry Hassenpflug, Huntington Pa.—This invention relates to a machine on which a circular saw, a reciprocating saw and a chisel can be arranged in such a manner that all work which can be performed on the said instruments can be done on the machine by hand or other power. The invention consists in the mode of applying and regulating the power by which the machine is driven so that the latter may be used for light and heavy work as may be desired. The invention also consists in an automatic feed motion, in the manner of securing and adjusting the bed for mortising, and finally in the device for holding the reciprocating saw wherein the chisel for mortising may also be secured.

PUMP.—Hiram Parks, Athens, N. Y.—This invention relates to the apparatus for operating pumps, which is such, that a pump can be worked at a distance of half a mile or more, when desired.

PLOW.—Frederick Volkmann, Hoboken, N. J.—This invention consists in securing the lower end of the upright screw shaft, to which the front end of the plow beam is secured, in the axle of the plow-ears, so that the upper frame and sliding-block, for sustaining the upper part of the said screw-shaft, may be dispensed with. It consists also in making the axle of one solid piece, and bending the draft bar, so that it will pass under the axle and not through the same. Also in making the attachment of the draft-chain to the plow-beam laterally adjustable, so that it can be regulated in conformity with the wearing of the plow-share.

COAL OIL-LAMP CHIMNEY.—John Belleryeau, Philadelphia, Pa.—This invention consists in so arranging a metal tube and securing it to the burner by means of narrow, metal strips, that a glass chimney may be placed over and around the narrow strips, so that the light will shine through the glass, while the destructive effects will be exerted on the metal and not on the glass.

BUTTON.—Joseph M. Prugger, New York City.—The object of this invention is to construct a button with its fastening secured to it in such a manner that the button may be easily applied to or detached from the cloth at will, and may be firmly held thereon.

CEMENT.—Patrick Kennedy, New York City.—This invention relates to a new composition for making a cement which is to be particularly adapted for securing door-knobs to the spindles, but which may also be used for other purposes.

SLEIGH BELLS.—W. H. Nichols, East Hampton, Conn.—This invention relates to a new manner of attaching the wire or pin, by which sleigh bells are secured to leather straps, and consists in at once casting the wires or pins in the bells; that is to say, the complete wire or pin is inserted into the mould and the bell is then cast around the same, so that the said wires or pins will afterward be securely held.

DEVICE FOR CLEANING THE TRAPS OF WATER-CLOSETS.—James Wright, New York City.—This invention relates to a device for cleaning the curved or S-shaped pipe or traps of water-closets, and consists in the use of a flexible rod which is inserted in the end of the pipe, and can accommodate itself to the shapes of the tube so as to completely clean the same.

EXTENSION NOTICES.

Bernard Hughes, of Rochester, N. Y., having petitioned for the extension of a patent granted to him the 16th day of May, 1854, for an improvement in trip hammers, for seven years from the expiration of said patent, which takes place on the 16th day of May, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 30th day of September next.

Stephen Morse, of Springfield, Mass., having petitioned for the extension of a patent granted to him on the 6th day of September, 1853, for an improvement in iron car brakes, for seven years from the expiration of said patent, which takes place on the 6th day of September, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 19th day of August next.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at 50 cents a line, under the head of "Business and Personal."

J. A. C., of Ga., says: Your rule for finding horse-power as given in your issue of June 1st, page 347, in reply to G. B. of Mass., says: "Multiply the area of piston by pressure of pounds per square inch and the product by number of feet traveled by piston per minute." Does it mean boiler pressure as indicated by steam gage, and if so does not the horse-power depend entirely on the pressure in the boiler? Is 33,000 always taken as the unit for horse-power? We reply, that the assumption is that the pressure on the piston is about boiler pressure. Probably this is never really so, and in many cases, owing to the distance of engine from boiler and the sinuousity of connecting pipes, etc., the engine pressure is very much less than the boiler pressure. Horse-power of an engine does *not* depend entirely upon boiler pressure. There are other important elements to be considered. This mode of calculating horse-power is never relied upon as absolutely correct; it is only an approximation to the truth. The indicator is the only sufficient test, so far as we know. 33,000 is generally received as the unit of horse-power, although 28,000 and 30,000 have been claimed as nearer the truth.

J. M., of N. Y.—We know of no rule applicable to all cases to determine the amount of horse-power developed or transmitted by shafting. The power of belts comprises so many elements that a calculation is exceedingly difficult; strength, position, and mode of running belts vary so greatly as to prevent the establishment of any general rule. The use of a dynamometer, of which there are several in the market, would probably give you a satisfactory result.

J. B., of N. Y.—If we understand your combination of belts and pulleys we not see any new arrangement. You merely gain power by the additional adhesion of the combined belts.

R. F. L., of Miss., wishes to drive a muley saw by friction. The driving pulley is 12 feet diam. with an 18-inch face of wood and the pulley on the saw shaft is 30 inch diameter and 18-inch face of iron. The two are too near for a belt unless a counter shaft is put up. From the data furnished we should suppose that sufficient friction might be generated to operate the saw. It might be tried and if not successful the counter shaft could then be hung.

J. S., of Mich.—It could hardly be supposed that railway car wheels would run long with any accuracy if they turned on their axles like those of an ordinary vehicle. A very little thought and observation will convince you of its impracticability as well as a column of explanation.

E. A. B., of R. I.—"Foot pounds" is a term used to denote force, and means simply the energy exerted by a falling weight. One foot is the force of one pound falling one foot in one minute or the power required to raise one pound one foot high in one minute. The unit of horse power, 33,000 pounds, raised one foot high in one minute, is 33,000 foot pounds.

J. H. B., of N. Y.—Homer cannot be accused of nodding in the paragraph you refer to, as a careful reading will show our assertion distinctly to be, that much less water will flow through four 1-inch pipes, than through one 4-inch pipe.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Cotton Factory Wanted at Coloma, Ill. See advertisement and address A. P. Smith, Sterling, Ill.

Mr. Lane, Patentee of the Sett Works for Saw-mill Carriage will please send his address to A. G. Dabney & Son, Lynchburg, Va.

Makers of Washboards—arrange with A. Packham, Prestonsville, Carroll county, Ky., to manufacture his $1 washing machine.

Petroleum as Fuel Successful at Last—Highly Important—See notice of patentee in advertising columns.

C. W. Hunt wants Wood-working Machinery and Steam Engine—See advertisement.

NEW PUBLICATIONS.

THE MECHANISM AND CONSTRUCTOR FOR ENGINEERS, by Cameron Knight. Part V has just been received; also, BOURNE'S TREATISE ON THE SCREW PROPELLER, Part XX, for May.

We have before given warm commendation of both these publications. The former is a valuable assistant to the forger and machinist as well as to the Engineer, and the latter interesting to builders of marine engines.

D. Van Nostrand, corner Broadway and John Street, this city, is the Agent.

THE MODERN CARPENTER AND BUILDER. NEW AND ORIGINAL METHODS FOR EVERY CUT IN CARPENTRY, JOINERY, AND HAND-RAILING, by Robert Riddle, Author of "Elements of Hand-Railing." D. Appleton & Co., 443 Broadway, New York.

This treatise is a large quarto, the letter press clear and distinct, illustrated by fourteen plates. The explanations are full and easily comprehended, and the diagrams plain. Practical workmen will find no difficulty in following the author's instructions.

TABLES FOR QUALITATIVE CHEMICAL ANALYSIS, by Prof. Heinrich Will, of Giessen, Germany. Seventh Edition. Translated by Charles F. Himes, Ph. V., Professor of Natural Science, Dickinson College, Carlisle, Pa. Published by Henry Carey Baird, Industrial Publisher, 406 Walnut Street, Philadelphia.

These Tables (there are eleven of them) exhibit in a compact form the tests and reactions of a large number of chemical substances. They are very useful for students and amateurs.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

1,067.—HAMMER.—Geo. Selsor and Wm. Cook, Philadelphia, Pa. April 10 1867.

1,119.—SHOES FOR HORSES AND CATTLE.—Henry F. Shearman, Elizabeth, N. J. April 15, 1867.

1,143.—BREECH-LOADING FIRE-ARM AND CARTRIDGE AND BALL TO BE USED THEREWITH.—Edward Lindner, New York City. April 18, 1867.

1,177.—FEEDER OR HOPPER FOR CENTRIFUGAL SUGAR MACHINES.—Helen Merrill, New York City. April 23, 1867.

1,179.—APPARATUS FOR SPRINKLING OR DIFFUSING LIQUIDS FOR REFINING SUGAR AND OTHER PURPOSES.—Helem Merrill, New York City. April 23, 1867.

1,181.—BLOWING AND PUMPING ENGINE.—Philander H. Roots, Cornersville Ind. April 23, 1867.

1,203.—STEAM ENGINE.—Fred. W. Gordon, Cincinnati, O. April 25, 1867.

1,211.—LIFE BOAT.—Albert L. Shears, Flint, and Wm. S. Driggs, East Saginaw, Mich. April 26, 1867.

1,215.—MACHINERY FOR BURRING WOOL, GINNING COTTON, ETC.—Robert J. Clay, James T. Husted, Ebenezer G. Burling, and Cornelius Corson, New York City. April 26, 1867.

1,234.—PACKING FOR STUFFING BOXES.—Ivon B. Miller, Philadelphia, Pa. April 29, 1867.

1,236.—BOBBIN.—Frederick W. Northrop, New Haven, and Ezra S. Munson North Haven, Conn. April 29, 1867.

1,250.—COMBINED TAPER HOLDER AND MATCH BOX.—John A Whipple, Boston, Mass. April 30, 1867.

1,262.—INSTRUMENT FOR INDICATING ATMOSPHERIC CHANGES AND THE FORCE OF STORMS.—Henry A. Clum, Rochester, N. Y. May 1, 1867.

1,266.—BOOTS AND SHOES.—Albert Van Wagenen, Boston, Mass. May 1, 1867.

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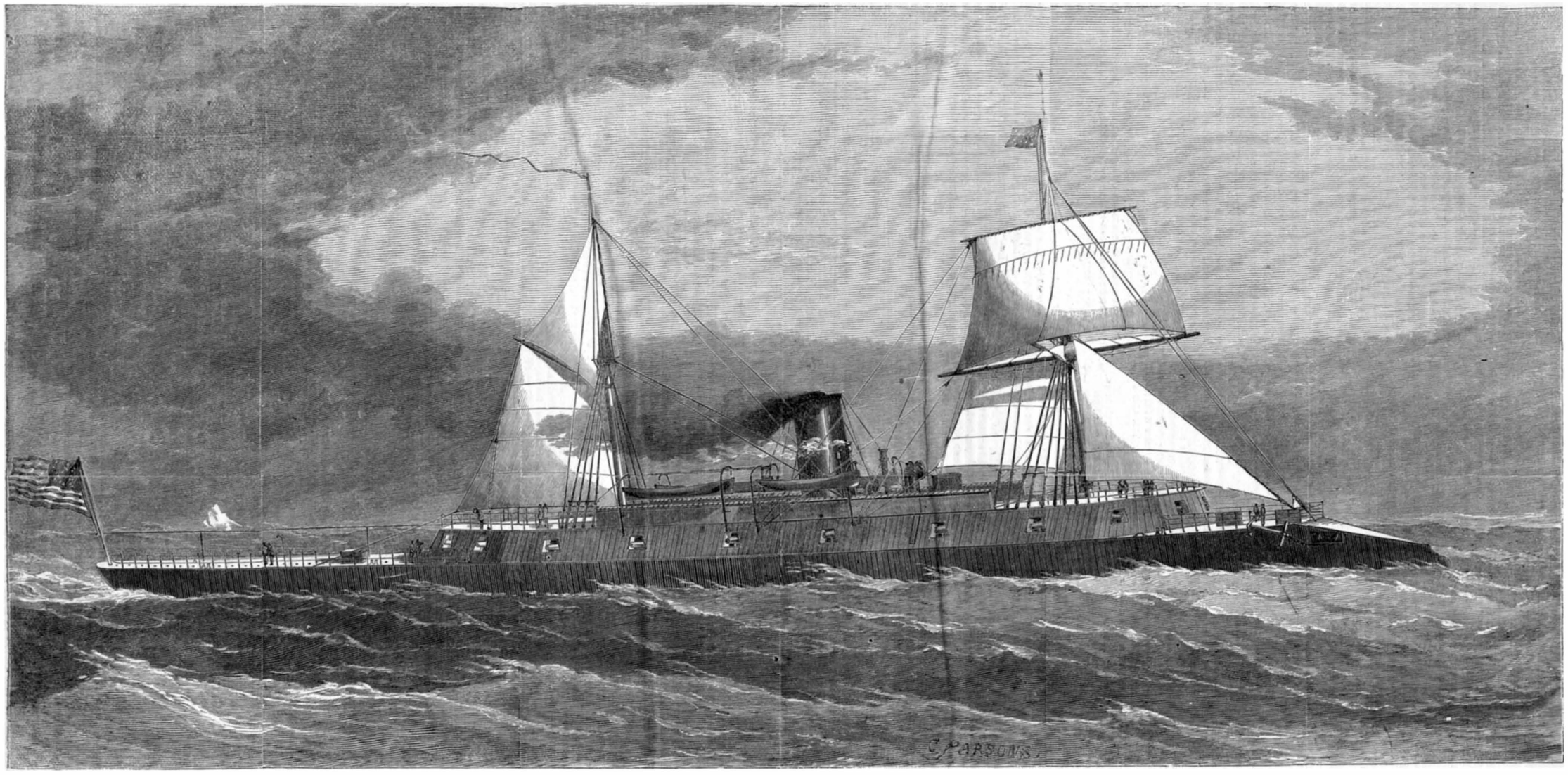

THE STEAM RAM AND FLOATING BATTERY DUNDERBERG, RECENTLY SOLD TO THE FRENCH GOVERNMENT.

THE DUNDERBERG.

The new proprietors of this magnificent ship—of which we present herewith a handsome engraving—were treated on the 13th to an exhibition of her steaming qualities, after a full overhauling of her machinery. She was tried four times on the measured nautical mile (6,085 feet) twice with and twice against the tide, making the four miles in 18 min., 32 sec.—an average of one mile in 4 min., 38 sec., or about 13 knots an hour, at an average of perhaps 22 lbs. steam pressure. With 25 lbs. at starting, the screw would make as many as 58 revolutions, but it was impossible to sustain the pressure, as the fires had become fouled by standing open the most of the day while adjusting the machinery. She was put about in 3 minutes, 14 seconds. The guns, which are U. S. property, were forbidden to be fired by order from the Navy Department.

We published a full and accurate description of the *Dunderberg* on page 173 of the present volume, to which our readers will find it interesting to refer in connection with the accompanying pictorial view. The figures therein given differ somewhat from those which have appeared in other publications, but as they have the authority of Erastus W. Smith, A. P. D., the designer of the machinery; Messrs. John Roach & Son, the builders, and Mr. Wm. H. Webb, the constructor and contractor of the ship, they are as near correct as may be.

The *Dunderberg* is a steam ram and also a floating battery. As a cruiser she was never intended. She is specially designed for coast defence—being a movable battery—and as such is not equaled by any craft afloat.

It never was pretended by those who had charge of her construction that she was entirely impregnable to shot, or that she could successfully contend against all land and sea batteries which might be constructed. The intention was the construction of a ship which might be used either as a floating battery, a ram, or, if necessity required, a cruiser, capable of carrying coal sufficient for a voyage, and of affording convenient accommodations to a crew. That these conditions are fulfilled in the *Dunderberg* cannot be successfully disputed. If she is not as fast as some smaller vessels, her great weight makes her very formidable as a ram, especially when the immense strength of her beak and bow are considered. As a battery, no ship that ever floated could carry and work such guns and so many as the *Dunderberg*, and be so little affected by their concussion. As a cruiser probably there are few iron-clads so economical, considering their tunnage, in the use of coal and oil as the *Dunderberg*. She must be considered as a *sui generis*, but as compared with the best specimens of broadside iron-clads, unequaled.

The ship is not entirely an experiment. Heavy guns in broadside ships having armored sides are not unknown nor untried. The *New Ironsides* has tested her strength against shore batteries. The *Dunderberg*, while not professing to take the place of the monitors, is a powerful ship, well armored, solidly built, molded according to the strictest rules of the ship-building art, and calculated as well for the shock of the seas as the opposition of hostile batteries.

Possibly in surrendering this floating battery and ram to a foreign government we may have done a foolish thing, but as the principle of our republican government is peace, and our war resources are almost unlimited, it would not, even under the circumstances of war, seem folly to part with one of our experiments, if we had already studied its construction and noted its defects. That the *Dunderberg* is an experiment, and an untried one, cannot be denied; but that she combines the principles of large offensive qualities with proportionally small exposure of vulnerable points is susceptible of proof.

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VOL. XVI., No. 26....[NEW SERIES.] ....*Twenty-first Year.*

NEW YORK, SATURDAY, JUNE 29, 1867.

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NOTICE TO SUBSCRIBERS.

To save several pages of room, which the pictorial title page and index we usually print in the last number of each volume would occupy, we shall print at this time an edition of an illustrated frontispiece and index separately.

Those who wish to preserve the work can be supplied gratituously with this sheet to bind with their volume on application to this office either in person or by mail, or through any dealers who supply the paper.

MODELS AND MONEY BY EXPRESS.

Parties should never inclose money in the box with their models. Express companies are not liable for the loss of money thus sent. It should be forwarded in a separate parcel and a separate receipt taken. It is safer to inclose currency in a letter by mail than to place it inside the box. The name and residence of the inventor should be attached to every model; and in sending money by express, a note should accompany it stating who it is from and the purpose for which it is sent. The name of the sender should also be written on the outside of the envelope. The best ways to make remittances by mail are by draft on New York, payable to order of Munn & Co., or by postal order; or currency by Express in an envelope separate from the model.

An owner is wanted for a draft for $16 from Baraboo, Stark county, Wis.; and for $32 currency from Oconomowock, Waukesha county, Wis. The senders of these amounts will please write to this office and inform us the object of their remittance.

THE SCIENTIFIC AMERICAN---A NEW VOLUME.

This number closes Vol. XVI of the SCIENTIFIC AMERICAN. It is probably unnecessary to recapitulate the peculiar features of this journal to our regular readers, but to others, who only occasionally see the paper, we wish to say a few words. Although not in the general sense a *news* paper, and in no sense a partisan paper, the SCIENTIFIC AMERICAN makes a weekly exhibit of the novelties in art and science, notices all useful improvements, new inventions, and discoveries. It aims to encourage honest endeavor and the inventive talent of the country and the world, by generous mention and judicious counsel. At the same time it will not hesitate to expose charlatanism and unwarranted pretention, thus protecting its readers from the imposition of mechanical and scientific quacks.

To the mechanics and scientists of the country, to all seekers after practical knowledge, our columns are always open. Their communications are received, read, and if of general interest, published. We intend to give all a fair hearing and a courteous consideration. If we ever fail in doing so at the time expected, it must be attributed to the limits of our columns and not to intentional neglect.

Our "Answers to Correspondents" are made by two editors both practical men, one in the domain of science and the other in mechanics. This department, alone, is worth much more than the subscription price of the paper. It contains an amount of really valuable information not to be found in volumes of "manuals," "encyclopedias," or other ostensibly scientific and mechanical works.

Our "correspondence" embodies the ideas of progressive men in all parts of the world, giving our readers an opportunity of communicating with each other and the great world on subjects affecting the advancement of science and the race.

The illustrations of new inventions are of inestimable value to the mechanic, the farmer, and the business man. The engravings are not surpassed in accuracy, and quality of artistic execution by any others, and the descriptions, by a thorough mechanic and vigorous writer, are plain and terse.

The weekly list of patents issued is a feature interesting and valuable to all classes. It is furnished officially, expressly for this journal, at an expense of several thousand dollars a year, and may be depended upon for accuracy.

Editorially the SCIENTIFIC AMERICAN will continue to be instructive and interesting. Fearless in the exposure of humbugs, alive to the progressive tendencies of the age, and just to all the improvers of the race, it will as heretofore strive to embody truth with talent and conservatism in principle with progress in practice.

THE PENDULUM IN ITS VARIED APPLICATIONS

The prize which the genius of Galileo gave the world, has proved more of an acquisition than he could have anticipated. The discovery of the isochronous vibrations of the lamp suspended from the Pisa cathedral, was not merely accidental. It was one of the most familiar sights, but the inquiring mind of the choir boy detected what probably no one before him had done, that while the extent of the arcs steadily diminished, the vibrations were completed in the same time. The principle appeared to him important and he caused it to be employed by physicians in counting the pulses of their patients.

Unquestionably the most useful application of the pendulum ever made, and one which early suggested itself, was in the measurement of time. Aside from this other applications of a scientific character have been devised, and an enumeration of some of the more important ones is the purpose of this article.

Dependent upon gravity for its motion, the pendulum has been of use in demonstrating anew the grand law propounded by Galileo, that gravity acts independently of the mass. This verification was made first by Newton who using a hollow sphere as a pendulum ball, filled it successively with feathers, liquids, metals, and ivory, finding that however the substances varied in density, in every case the same time was required to complete the oscillations. As the rapidity of the oscillations increases with the increase of the force that at every swing attracts it downward, by accurately noting the difference in pendulum vibrations at the surface and below it, the measure of the relative intensity of gravitation may be estimated, and consequently the form as well as the density of the earth determined.

Few incidents of scientific interest have ever excited more general interest than the experiment devised by M. Foucault of Paris, in 1851, for demonstrating the rotation of the earth by means of a pendulum and making this rotation visible to the eye of an observer. His mode of procedure was as follows: From the center of the dome of the Pantheon was hung a fine wire 210 feet long, terminated by a heavy ball, the whole swinging freely as a pendulum. Beneath the ball was placed a round table. Now it can be shown by the principles of mechanics, that a pendulum once in motion, will not change the direction of its oscillation, however the point of support may be rotated, so that in this case the diurnal revolution of the earth will not affect the plane of vibration, but the latter will maintain strictly the same direction during the twenty-four hours. In this interval, however, the table, in consequence of this diurnal motion, will continually change its position so as to make a complete revolution around its center. As a consequence it will soon be found that the ball of the pendulum never returns precisely to the same starting point after two successive vibrations, and a line marked by a projecting point of the ball upon the table, will show the earth's rotation. If the experiment were tried at either pole, a complete apparent revolution would be seen every twenty-four hours. At the equator, on the other hand, the plane of vibration is carried forward by the revolution of the earth and so undergoes no change with reference to the meridians. Between these localities the time required to complete the rotation varies with the latitude, being greater as we recede from the poles.

In establishing a universal standard of measures, some natural unit needs to be selected. The space travelled over by light in the ten-millionth part of a second, has been proposed as furnishing this invariable unit; the length of an undulation of a ray of light of some definite refrangibility has also been advanced, but this inappreciable length must be multiplied a million fold to furnish a suitable unit. The linear dimensions of the earth, and the linear measure of its attraction embodied in the pendulum, are the only available sources of invariable and universal standard length, and were acknowledged as such by the members of the French Academy previous to the adoption of their present decimal system. They hesitated for a time which of these to accept, and it is to be regretted that final choice was made of the former, taking the ten-millionth part of the quadrant of a meridian as a metrical unit. This measurement afterward proving incorrect, the whole system is now founded on just what the projectors sought to avoid, viz., an arbitrary unit. As if admitting an unwise decision, the Commissioners, in their report recommending the metrical system, were careful to insert this provision, that in the event of the loss or destruction of all material representatives of the metre its value might be recovered from a specified relation existing between its length and that of the pendulum vibrating seconds at Paris. The English Parliament in 1824 made a similar proviso for restoring the standard yard should it be lost, defaced, or otherwise injured, enacting that in this case a new standard should be constructed bearing the same proportion to a seconds pendulum vibrating seconds of mean time in a vacuum at London and at the level of the sea, as 36 inches bears to 39·1393 inches, the length of the seconds pendulum at London. The failure of the attempt to put in force this enactment in 1834, after the destruction by fire of the Parliament buildings and the standard yard with it, was owing to an inaccuracy in the previous measurement of what was to become the basis of their calculation, viz., the pendulum, and a new standard was finally made from a careful comparison of the most accurate and best authenticated copies of the old standard yard. This failure of course argues nothing against the employment of the pendulum in the capacity of a linear measurer, and it is quite certain that should any system of measures universally accepted by civilized nations, be formed, the pendulum would at once be looked to as furnishing the proper standard, being imperishable, invariable, and capable of identical reproduction.

AN ANSWER TO THREE INQUIRERS.

We have before us three letters of inquiry from three young men asking advice on the same subject. As there may be many more in search of similar information, we propose to reply through our columns instead of by mail, giving briefly what information we may, drawn not from observation alone, but from a somewhat rough personal experience.

W. J. of N. Y. says he is a "poor boy without means and desires to become a mechanical engineer." He wants to know the "proper course to take, and the studies to be pursued."

J. N. of Pa. is an "apprentice in a machine shop; has served two years and has three more to serve." He thinks he "could accomplish a great deal in that time and is determined to do all he can; wants to know what studies to take first; has books on philosophy, arithmetic, geometry, algebra, etc., and desires advice to assist him."

E. A. B. of R. I. has "recently finished his apprenticeship in a machine shop; wishes to learn more;" asks "what studies he shall pursue to become a mechanical engineer, as he has to depend entirely upon himself."

Here we have an untaught boy, an apprentice to the machinist's business, and one just out of his apprenticeship. The three positions probably represent a very large proportion of our young male readers; so what we may advise may be of as much use to others as to the inquirers themselves

First, then, to become a mechanical engineer involves becoming a practical mechanic, a workman. To be this requires a patient apprenticeship to the machinist's business and a constant effort during the time to become master of the tools used and the processes employed. We do not propose to discuss the duties of the apprentice; these are taught in the shop. Obedience to orders, application to work, a determination to do whatever work is given in the right way and well, and an endeavor to understand what he is doing, are among the requisites of the intelligent and progressive apprentice. Now, the intellectual preparation for the business of the mechanical engineer can be made during the apprenticeship and both this and the mechanical dexterity can be improved vastly after the period of novitiate is finished. The evenings of the apprentice and the workman are their own. Let them be used.

A knowledge of arithmetic is indispensable. It must be thorough. The good mechanic ought to be a good arithmetician. By this term we comprehend a knowledge of algebra and some acquaintance with the higher branches of mathematics. Grammar is not to be despised. The engineer must often be required to state in writing, as well as verbally, his reasons for a process or a combination of devices, and to explain his own ideas so that others may comprehend them. It detracts much from the influence of an engineer or a mechanic if he is not able to put his ideas into presentable language.

Natural philosophy is a desirable study. Indeed some departments are absolutely necessary to the mechanic's success. Geometry and the practice of mechanical drawing are essential to the engineer, if he expects to be able to direct and control as well as to obey and perform. Among the books especially intended for the mechanical engineer may be enumerated a number of the manuals or hand books published from time to time, as Scribners, Molesworth's, and others. Then there are Bourne's Hand book of the Steam Engine, Byrne's Practical Metal Worker's Assistant, Bourne's Catechism of the Steam Engine, Burgh's Land and Marine Engines and Boilers, Morin's Mechanics, Bartlett's Mechanics, Williams on Heat and Steam, and many others which may be studied with profit and interest after the requisite knowledge of arithmetic, language, and natural philosophy has been obtained.

After all, however, more depends upon the energy and determination of the apprentice than upon these aids. One may have all these and more and yet from want of pluck and persistence remain forever in a subordinate position.

AN UNDERHUNG RAILROAD CAR has been proposed before the Institution of Engineers in Scotland, with a view to admit the use of larger wheels, and to diminish the lateral action by lowering the center of gravity. Not to speak of the increased weight in proportion to capacity, the intolerable aggravation of the dust nuisance, and the instantaneous and inevitable destruction of any car run off the track, interpose a peremptory veto in advance of any change in this direction.

PRESERVATION OF MILK.—It is stated that dairywomen have discovered, but philosophers have not explained the reason, that milk suddenly cooled after being drawn from the cow will keep much longer than otherwise. The cheap, artificial methods of reducing temperature in three or four minutes to any desired point, may yet find a general and very useful application in milk dairies, although its effect upon the production of butter is questionable.

THE STRAWBERRY exhibition of the American Institute has been postponed one week; that is, until Tuesday and Wednesday evenings, the 25th and 26th instant.

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ISSUED FROM THE U. S. PATENT OFFICE
FOR THE WEEK ENDING JUNE 11, 1867.
Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat.....$10
On filing each application for a Patent, except for a design.....$15
On issuing each original Patent.....$20
On appeal to Commissioner of Patents.....$20
On application for Reissue.....$30
On application for Extension of Patent.....$50
On granting the Extension.....$50
On filing a Disclaimer.....$10
On filing application for Design (three and a half years).....$10
On filing application for Design (seven years).....$15
On filing application for Design (fourteen years).....$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

65,525.—LADDER.—P. M. Ackerman, Webster, N. Y.

First, I claim the combination of the ladders, A and B, the latter being provided with the flat windlass, H, and having the rope, b, arranged as shown and described.

Second, The hook, D, having the weighted tumbler, E, provided with the pin or stop, o, pivoted to it and arranged to strike the rounds of the ladder, and thereby raise the hook and let it pass the round both in ascending and descending, substantially as described.

Third, In combination with the ladders, A and B, and the flat windlass, H, I claim the ratchet, d, and pawl, e, arranged as set forth.

65,526.—FIRE ALARM.—W. W. Andrews, J. Cummer, J. F. Ganweiler and Jost Stengel, Croton, Mich.

First, I claim the employment of cords, B B, when said cords are saturated with some inflammable material for the purpose of more effectually enabling them to be consumed or severed in case of fire, substantially as described.

Second, The employment of rods, C C, in the manner specified for the purpose of indicating the exact room or locality in which the fire originated in combination with levers, G, and weights, F F, substantially as described.

65,527.—BOTTLE PUMP.—George Asmus, Houghton, Mich.

I claim a bottle pump, constructed and arranged substantially as described, as an article of manufacture.

65,528.—MOP AND BRUSH.—A. C. Bacon, Cleveland, Ohio.

First, I claim the frame, B, provided with the head, B' fingers, b, arms, D C, screw, E as and for the purpose substantially as set forth.

Second, The herein described holder, in combination with the brush or mop, substantially as and for the purpose specified.

65,529.—PLOW.—Ephraim Ball, Jr. Canton, Ohio.

First, I claim so condcting a metal plow beam, that the parts that are attached thereto, can be made either of cast iron or steel, or of both, substantially in the mauner herein specified.

Second, The combination of a steel mold board, point and land side with cast iron plow beam when said plow beam serves for the purpose of a support to the mold board, point and land side and also for a plow beam, substantially in the manner herein specified.

Third, The brace, K, and bar, O, when used in connection with the plow beam, A, substantially in the manner and for the purpose herein specified.

Fourth, The groove, t, in the plow beam, A, when arranged in the manner and for the purpose herein specified.

Fifth, The dovetail at h, in the top of the groove, s, when used in connections with the projections, n, on the land sides, K and M, substantially in the manner and for the purpose herein specified.

Sixth, The attachment of the cutter, P, to the cast iron plow beam, A, in the grooves, a a, in said beam in the manner herein specified.

Seventh, The L-shaped block, G, in cast iron point, when said point is used as a part of the cast iron attachments in the manner herein specified.

Eighth, The block, H and I, and hooks, L and N, constructed and arranged in the manner herein specified.

65,530.—LUBRICATOR FOR SPINNING MACHINES.—Joseph B. Bancroft, Hopedale, Mass.

I claim the combination and arrangement of the oil chambers, c d, the groove, f, and the hole or holes, e, with the bracket, D, the neck, H' and the gear, E, the whole being substantially as described.

65,531.—SKATE.—E. H. Barney and John Berry, Springfield, Mass.

First, We claim as a new article of manufacture, the pieces, f f, when punched or upset from the foot plate, A, in combination with the clamps, a and a', having beveled edges, h h, all made substantially as herein described and for the purposes set forth.

Second, The pin, e, when attached to the clamp, a, and operating in the groove, e, or against the collar, i, on its outside, when made substantially as herein described, and for the purpose herein set forth.

65,532.—GRADUATED BEVEL SQUARE.—Solomon E. Bickford and Frederick Flanders, Franklin, N. H.

We claim the within described bevel square consisting of the blade, A, with its inner and outer scales, and the blade, B, with its indicators, e, connected by the screw pin, b, and nut, C, or their equivalents, arranged and operating substantially as set forth.

65,533.—MANUFACTURE OF STOPPLE FOR BOTTLES.—Leverett Bishop, Paris, N. Y.

I claim the right to make and use in the fabrication of stopples for bottles, a substance called lignine, or an approximation thereto, also light porous woody fiber, as both herein specified, by means of compression into molds or forms herein mentioned and described.

I claim compression as above only for the specific purpose of securing to such stopples the quality of rapid expansion by moisture and somewhat of cork-like elasticity and for giving them certain definite artistic shapes.

65,534.— APPLE PARING, CORING, AND SLICING MACHINE.—A. McR. Blain, Deerfield, Va.

First, I claim the coring blade, L, shaft, M, clutch pulley, N, and bent spring, P, in combination with the horizontal frame, K, frame work, A, and prong shaft, B, constructed and operating substantially as herein shown and described.

Second, The arrangement of the prong shaft, B, halving knife, H, coring knife, L, and slicing blades, T, with each other and with the frame, A, when all are constructed and operating as herein described and for the purpose specified.

65,535. — BOOT BLACKING. — Alaxandr Boudrou, Philadelphia, Pa.

I claim the compositions composed of the ingredients named, for blacking leather boots and other articles of leather, stoves and other articles of iron, and for coloring polished iron, substantially as described.

65,536.—STEAM ENGINE.—R. Brayton, S. Curtis and David June, Fremont, Ohio.

First, We claim the cam, d, yoke, c, stem, b, and valve, a, as arranged in combinarion with the chamber, P' valve, i, and pipes, O' and R, for the purpose and in the manner as herein described.

Second, The link, K, rock shaft, J, and link, e', as arranged in combination with the cam, d, yoke, c, stem, b, and valve, a, for the purpose and in the manner set forth.

65,537.—BOTTLE STOPPER AND COUPLING.—Wm. D. Brown, Milwaukie, Wis.

First, I claim the bottle, A, tube, B, and coupling, C, in combination, substantially as and for the purpose described.

Second, Coupling, C, when made with flange or flap, D, as described.

Third, Fexible stopple, E, when made with flange or flap, F, substantially as described.

65,538.— FURNACE FOR DESULPHURIZING ORE. — William Bruckner, San Francisco, Cal.

I claim the inclined partition, D, in the form of a deviating square or any other shape placed at any inclination or angle to ensure a constant passing around it of the material to be treated, said partition to be constructed of iron plates in sections or as a whole, and covered with fire-proof material, with surfaces flat or double concave, substantially as described and for the purposes set forth.

65,539.—WATER WHEEL.—E. G. Budd, Budd's Lake, N. J.

I claim the wheel proper, C C CC, D D D D, E E E and L, the leverage buckets, H H H H, with levers, I I I I, the adjustable wheel, F', with arm, G, constructed substantially as and for the purposes set forth.

65,540.—RAILWAY CHAIR.—Samuel S. Burt, Marquette, Mich.

First, I claim a three part railroad chair which is adapted for a reversible H rail and so constructed that the base of the rail will be received and closely held partly by a recess, e, in the chair base and partly by recess, j j, the side supports, B, substantially as described.

Second, In combination with a double headed rail constructed with flat shoulders at c c, I claim a three part chair, A B B, with the lower head or base of the rail fitted into a recess, e, in the chair base, A and the lips of the rail heads sustained by the upper portion, C' C', of the side plates, B B, substantially as described.

65,541. — WAGON AXLE TREE. — Cornelius L. Campbell, Binghampton, N. Y.

I claim marking the skein of the same angle from end to end, in combination with the depressions, G G, on the large end or shank of the skein, substantially in the manner and for the purpose herein described.

65,542.—METRONOME.—Henry C. Carden, Paris, France.

I claim the combination of the ratchet wheel, f, mounted on an escapement wheel, e, with the rocking lever, u, the thread, v, and the spiral spring, z, in manner and for the purposes substantially as herein set forth and shown in figures of the annexed drawing.

65,543.—BOOT JACK.—Cyrus Clay, Scranton, Pa.

I claim the concave toe cup, C, handle, d, and bail, e e, as constructed and attached to the prongs, a a, in combination with a metallic boot jack, A, substantially as herein described.

65,544.—TURNING CURVE OF RAILROADS.—George Collyer, Philadelphia, Pa.

I claim the main rails, A and B, and the auxiliary rail, C, when used in combination with car wheels each having two threads, e f, the whole arranged and operating substantially as set forth.

65,545.—SEASONING AND PRESERVING WOOD.—S. Constant, Peekskill, John Smith, Brooklyn, N. Y. Antedated March 17, 1867.

We claim the chamber, A, generator, D, in combination with blowers, bellows or other suitable device to drive the heated air and smoky vapor out of the generator into the chamber, the connecting pipes, H and I, and escape pipe, K, all arranged and applied substantially as and for the purpose specified.

65,546.—MACHINE FOR DRAINING SUGAR.—Hiram A. Coppess, Greenville, Ohio.

First, I claim the rotating strainer of the form of the frustum of a cone as and for the purpose described.

Second, The combination of the conical distributor with the radial ribs, substantially as set forth.

Third, The rotating strainer, A, in combination with the conical distributor, B, the vertical shaft, S, the fast pulley, H', and the loose pulley, H, in the manner explained.

65,547.—FEED WATER HEATER.—William Crighton, William Wills and Louis Rastetter, Fort Wayne, Ind.

We claim the center pipe, c, in combination with concave and convex disks, for the purpose of distributing the water and steam, in the manner and for the purposes described.

Second, We claim the water and steam distributor, E, the same being constructed in the manner and for the purposes described.

Third, We claim the concave disk, D, in combination with the water and steam distributor, E, the same being constructed and operated in the manner and for the purpose described.

65,548.—MILK CAN.—A. P. Curry, Chagrin Falls, Ohio.

I claim the concave bottom, B, auxiliary bottom, C, and packing, D, as constructed and arranged in combination with the can, H, for the purpose and in the manner set forth.

65,549.—ATTACHING DRAFT TO VEHICLES. — G. S. Curtis (assignor to himself and Ellis G. L. Faxon), Chicago, Ill.

I claim the combination of the ordinary whiffletree, M, and pole, A, with the bed plate, B, the jaw E, the rod, C, the rubber spring, G, and the washer, J, and the nut, N, for the purpose of tightening and loosening the spring, G, when all are constructed and operate substantially as and for the purposes herein described.

65,550.—WRENCH.—William P. Dunlap, Maquoketa, Iowa.

I claim a wrench constructed substantially as and for the purpose set forth.

65,551.—MEAT CUTTER.—Daniel S. Early, Hummelstown, Pa.

I claim the combination of the rotating cutter block, D, gearing, E F G I, cam shaft, J, and vertical spring choppers, F, constructed and operating substantially as described and represented.

65,552, 65,553.—Canceled.

65,554.—STOVE PIPE DRUM.—Adam Ernst, Milwaukee, Wis.

I claim the herein described heating apparatus, the same consisting of a drum or radiator capable of being applied to a stove or pipe of ordinary construction and provided with flues arranged substantially in the manner and for the purposes herein shown and described.

Second, The combination and arrangement of the inner or direct smoke flue and annular air chamber surrounding the same with the outer helical flue or radiator and the pipes or tubes for connecting the sections into which the said flue is divided substantially as herein described.

65,555.—CHANGE BOX.—James B. Eurtis, New Orleans, La.

I claim, First, The oscillating box, C, pivoted at its ends to the flanges of plates, B B, substantially as and for the purpose set forth.

Second, The oscillating box, C, pivoted at its ends in plates, B B, in combination with the bell, D, or its equivalent arranged and operating substantially as described and for the purpose set forth.

65,556.—BED BOTTOM.—J. S. Farrington, Milwaukee, Wis.

I claim top and bottom frame, E, with bell shaped openings with rubber, B, guide rods, A, and pins, D, all combined and arranged substantially as and for the purpose described.

65,557.—TOOL FOR CUTTING WIRE.—William H. Flinn (assignor to himself and James N. Kendall), Nashua, N. H.

I claim my improved wire or rod cutter made as described, viz: with each cutting hole of each pair of such holes of the plates, B and e, arranged obliquely to the touching faces of such plates, substantially as and for the purpose hereinbefore described.

65,558.—MOP WRINGER.—Charles W. Gage and James Northrup, Homer, N. Y.

We claim in connection with the mop pail, A, the stationary roller, B, and swinging roller, b, operated by the foot levers, D d, and springs, H, when so arranged that the rollers are opened by the foot levers and the wringing done by the springs, substantially as and for the purpose set forth.

Second, The joint formed between the levers, D d, by severing them at the foot rest, f, and pivoting their ends thereto, substantially in the manner and for the purpose set forth.

Third, The employment of the C, springs, H, as herein shown and the method for regulating the pressure, substantially as set forth and for the purpose described.

65,559.—ICE CREAM FREEZER.—Charles Gooch, Cincinnati Ohio.

I claim the combination of the concave scraper, I, to remove the frozen cream from the walls of the can, D, the convex agitator, H, extending from near the center of said can arranged with a space, i, between them and adapted to operate as herein described.

65,560.—LAST LOCK.—Dennis Goodyear, Ithaca, N. Y.

I claim, First, The described device composed of the parts, G, the plug or pin, F, the sheath and its dog or tooth and handle, D, or other convenient equivalent for turning and thus locking the same in the last as described.

Second, The device of a pin or plug thrust through the last block into the last and held there by friction, a dog or tooth or other convenient means when the locking is done by the cam-like action of the pin or plug as described.

65,561.—BOLT-HEADING MACHINE.—S. W. Goodyear and W. F. Parker (assignors to Charles Parker), Meriden, Conn.

First, The combination of the two heading punches, f and c, and spindle, f, with the revolving die plate, C, all constructed, arranged and operating substantially as set forth.

Second, The combination of the solid movable dies with the upsetting spindle, I, arranged as described, so as to recede after the blank is upset and allow the complete head to be formed after the said spindle has so receded

Third, The cam, h, slide, m, and pawl, n, in combination with the pawl, P, and ratchet, R, arranged and operating substantially as herein described.

65,562.—JOINER'S PLANE.—Arthur Gray, Naples, Me.

I claim the combination of projection, c, on the back iron with the staple, k, and thumb screw, m, on the clamp, when arranged as and for the purposes set forth.

65,563.—METALLIC COMPOUND OR ALLOY.—Julius Hackert, New York City.

I claim a metal compound made of the ingredients herein specified and mixed together, substantially in the manner and about in the proportions set forth.

Also the addition of saltpeter and cream of tartar to a compound of copper and zinc, substantially as and for the purposes described.

65,564.—STILL.—George Hadley, Buffalo, N. Y,

I claim, First, A series of jackets of graduated temperature applied to the pipe of a still to eliminate by successive stages a fluid of given tenuity and return the heavier condensed vapors.

Second, A tube, a, leading from the still and provided at different points in its length with a succession of condensers adapted to condense successive portions of the vapor therein.

65,565. — MACHINE FOR MAKING CORDAGE. — James Hall, Monroe Township, N. Y.

I claim the arrangement of the spindles, 1 2 3, drum, D, truck, T, ways, W W, and rollers, E E', with the endless rope or belt, B, all operating together in the manner and for the purpose set forth.

65,566.—DOOR HOLDER.—John J. Harris and Isaac H. Mosher, Greens, N. Y.

I claim as a new article of manufacture the bolt, A, constructed and operating substantially as and for the purposes specified.

65,567.—SCREW MACHINE.—Harvey J. Harwood (assignor to himself and J. F. Lyman), Utica, N. Y.

I claim, First, The combination of the dies, I and K, and the guides, M M, constructed and operating substantially as described and for the uses and purposes mentioned.

Second, The combination of the said dies and guides and the set screw, M', constructed and operating substantially as described and for the uses and purposes mentioned.

65,568.—LATHE FOR TURNING WOOD.—Horace R. Hawkins, Akron, Ohio.

I claim the combination with a turning lathe of ordinary or suitable construction of a face plate and eccentric or driving center under such an arrangement that the arm of the axle placed in the machine may be turned with a combined gather and pitch, in the manner herein shown and specified.

65,569.—LIFTING JACK. —Azro Healy, Kalamazoo, Mich.

First, The arrangement and combination of the prime lever, L, lifting chain, M, and secondary lever, N, with the end ratchet, R, and foot pawl, P', substantially as and for the uses herein set forth.

Second, I claim the aforesaid arrangement of combined parts used in connection and combination with the lifting bars, F and E, lifting pawl, P2, and manipulating cords or wires, e and f, the several parts being arranged relatively with the frame of the jack and with each other, and constructed and operated substantially in the manner and for the purposes herein described.

65,570.—WELL TUBE —A. E. Heberd, Homer, N. Y.

I claim the combination of the auger, D, secured to the tube, C, by bolt, F, cap, A, anvil, B, bar, G, with the tube, all constructed, arranged and operated as described.

65,571.—FEED CUTTER.—Henry Helm, Pittsburgh, Pa.

First, I claim the rotary eccentric knife, g, provided with slots, h h', in combination with the knife block, f, substantially as and for the purposes described.

Second, The projection, p, on the knife of a feed cutter in combination with the curved bar, l, provided with a notch or groove, l', substantially as and for the purpose above described.

65,572.—WATER WHEEL —G. Wm. Holden (assignor to himself and James P. Upham), Claremont, N. H.

I claim, First, The guides, m, applied at the backs of the buckets of the water wheel, substantially as and for the purposes specified.

Second, I claim the reverse curves, l, at the outer ends of the water wheel buckets in combination with the guides, m, at the back and outer ends of the buckets, substantially as and for the purposes set forth.

Third, I claim the curved lower edge, n, of the bucket in combination with the guide, m, substantially as and for the purposes specified.

Fourth, I claim the movable curved section, u, hinged to the swinging section, s, that moves with the shaft, t, substantially as and for the purposes set forth.

Fifth, I claim the segmental gate, p, in combination with the movable curb section, u, and swinging section, s, as and for the purposes specified.

Sixth, I claim the lever, v, fitted substantially as specified in combination with the swinging section, s, and curb section, e, for the purposes set forth.

Seventh, I claim a horizontal shaft, z, extending from the step for the shaft, c, to the outside of the water way to one end of which mechanism is applied to turn the same, substantially as specified, and the other end is fitted to act upon the step to raise or lower the same by substantially the means specified.

65,573.—HORSE RAKE.—James Hollingsworth (assignor to J. M. Wanzer), Chicago, Ill.

First, I claim the construction of a rake tooth bearing, J, with three passages at right angles to each other when said bearings are of a form to abut directly against one another and the teeth extend clear through the top passage of the bearing, substantially in the manner and for the purposes described.

Second, The construction of the eye bearings, g, for suppoating the rake teeth, T, and holding the spring, substantially as described.

Third, The combination of the jointed bearings, J, and eye bearings, g, with a rake tooth of the form substantially as herein described.

Fourth, The combination of the bearings, J, with set screws, l, the rocking frame with its arms and the eye bearings, g, with their springs, substantially in the manner and for the purposes described.

65,574.—CAR SPRING.—Edwin J. Horner, Wimington, Del.

I claim a series of oblong metallic semi-elliptical plates each having an opening, x, near its center arranged together as herein shown with full elongated ellipses between semi-elongated ellipses placed within a box, A, having a vertical rib, d, whereby they are alone secured in their proper places and held by the pressure of a grooved block, B, in the manner as herein specified.

65,575.—LOZENGE MACHINE.—John S. Howell and Charles W. Carter, Portsmouth, N. H.

We claim the combination and the arrangement of the roller, a, and the traversing carriage, f, carrying the cutters, c c, clearing board, e, and receiving board, g, all combined for joint operation, substantially as set forth.

65,576.—WINDING TATTING SHUTTLE.—H. P. Jones, Davenport, Iowa.

I claim the employment of sliding tubes or rings, a a, upon the ends of the rotating rod, D, so as to receive and secure in place tatting shuttles of different lengths, substantially as and for the purpose described.

65,577.—POST-HOLE AUGER.—John Killgore, G. D. Clapsaddle and Edward Snart, Arcola, Ill.

We claim the arrangement of the sleeve, J, and its pin, K, with the shaft, H, frame, B, and band, G, substantially as and for the purpose herein specified.

65,578.—CORN DROPPER.—Robert P. Killin, Canton, Ohio.

I claim the separator, J, attached to the valve standard, B, in the manner and for the purpose herein specified.

Second, The spring, H, attached to the valve standard of this or any other seeding machine, substantially in the manner and for the purpose herein set forth.

Third, The mode of construction of the valve standard, B, the rod, X, being made of wrought iron and the part, Y, of cast iron, substantially in the manner and for the purpose herein specified.

65,579.—METHOD OF MAKING SIDE BANDS OF WATCH CASES. George W. Ladd (assignor to John A. Brown), Providence, R. I.

I claim the method of constructing the side band for watch cases, substantially as herein described for the purposes specified.

65,580.—MEDICAL PREPARATION.—Charles L. Lege, San Antonio, Texas.

I claim the invention of making this powder and its application as a poultice and a medicinal remedy against the scurvy, as herein described.

65,581.—METHOD OF CASTING TWEERS.—William P. Lewis, Pittsburgh, Pa., assignor to himself and Wm. H. Sims.

I claim the method of beveling the ends of the center pipe of a tweer, substantially as described, and casting the ends of the outer shell of the tweer on to and around the surfaces so beveled or flanged, substantially as and for the purposes set forth.

65,582 —SAFETY GUARD FOR RAILWAY CARS.—Samuel Males, Cincinnati, Ohio.

First, I claim the adjustable guard made in sections encasing the wheels, substantially as and for the purpose set forth.

Second, The arrangement of ratchet bow, catch, links, bolts, nuts and springs which admit of the perpendicular adjustment of the guard, substantially as described.

65,583.—POTATO DIGGER.—George Meader, Prairie Centre, Ill.

I claim the combination of the standards, D, and the fork, C, or its equivalent, provided with suitable handles, and arranged and operating substantially as and for the purposes specified.

65,584.—MOP HEAD.—George Meader, Prairie Centre, Ill.

I claim the combination of the handle, A, plate, B, jaw, C, and latch, D, all arranged and operating substantially in the manner and for the purposes specified.

65,585.—BREECH-LOADING FIRE-ARM.—Isaac M. Millbank, Greenfield Hill, Conn.

First, I claim the segment of a cylinder, i, within a recess at the rear end of the swinging breech block, c, in combination with the lever, f, that is employed for both turning the said segment, i, and opening or closing the breech by the block, c, substantially as and for the purpose set forth.

Second, I also claim supporting and guiding said segment, i, by the cylindrical portion at x, as set forth.

65,586.—FURNACE FOR REDUCING METALLIC ORES.—Eugene Wm. Nohl, Ripon, Wis., assignor to himself and Edward Daniels, Chicago, Ill.

First, I claim a furnace provided with short pipes or passages for introducing the gas, hot from the generator, into the furnace, and also with a blast of air, the meeting currents of gas and air directing the flames upon the ore, substantially in the manner and for the purposes set forth.

Second, I claim the raised center of the bed of the furnace for supporting the ore, and allowing the fused metal to flow away from the central heat and be drawn off without being overheated or burnt, substantially as described.

Third, I claim a gas generator provided with a blast, in combination with a furnace for burning the gas before cooling, substantially in the manner and for the purpose specified.

65,587.—BRACE FOR SUPPORTING THRASHING MACHINES.—J G. Northway, Kemosha, Wis.

I claim the combination of bed, A, brace, B, and dog, C, when arranged substantially as set forth.

65,588.—SELF-ADJUSTING WRENCH.—A. M. Olds, New York City. Antedated May 27, 1867.

I claim the above-described wrench as an improved article of manufacture.

65,589.—PLIERS.—A. M. Olds, New York City. Antedated May 27, 1867.

I claim the combination of the handles, segmental spiral arm, and movable jaw, substantially as arranged and described.

65,590.—MACHINE FOR MAKING PAPER TUBES.—James A. Olney, Providence, R. I.

I claim the combination as well as the arrangement of the endless pasting or covering belt, B, the trough, F, the presser, G, the fluted roller, H, the discharger, K, and the scissors, O, the said belt, scissors, roller, and discharger being provided with mechanism for operating them substantially as described.

I also claim the combination as well as the arrangement of the endless pasting belt, B, the trough, F, the feed roller, M, the fluted roller, H, the discharger, K, and the scissors, O, the said belt, feed roller, scissors roller and

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discharger being provided with mechanism for operating them substantially as described.

I also claim the combination as well as the arrangement of either or both of the devices, t u, the endless carrying and pasting belt, B, the trough, F, the presser, G, the fluted roller, H, the discharger, K, the scissors, O, such belt, scissors, roller, and discharger being provided with mechanism for operating substantially as hereinbefore described.

65,591.—GATE.—Calvin H. Paine (assignor to himself and Wm. D. Milton), Providence, R. I.

I claim the combination of the chambered posts, or their equivalents and the folding gate made of the crossed bars connected as described.

I also claim the combination of the chambered posts or their equivalents, the folding gate and mechanism substantially as described, for operating such gate in manner as explained.

65,592.—FENCE.—Calvin H. Paine (assignor to himself and Wm. D. Hilton), Providence, R. I.

I claim the fence as made with the lazy tongs, or folding section or body, arranged and combined either with grooved posts or the same and rails, substantially as specified.

65,593.—APPARATUS FOR AMALGAMATING AND COLLECTING GOLD AND SILVER FROM ORES.—Wm. P. Parrott and J. J. Bordman, Boston, Mass.

We claim a combination consisting not only of one or more rollers and one or more troughs of mercury or for holding mercury, but of one or more scrapers, or their equivalents, for removing the amalgam from the surface or surfaces of such roller or rollers, the whole being substantially as described.

We also claim the arrangement of two rollers and their mercury troughs so that the said rollers while in revolution may take up the mercury from the trough and by their combined action press it against or cause it to adhere to and spread evenly on their surfaces.

We also claim the construction of the mercury trough so as to extend up between the two rollers and guide the mercury up to their bite while they are in revolution, the same being as exhibited in fig. 6.

We also claim the combination of the heating chamber, E, or a means of heating the trough of mercury or the same and its roller or rollers, with the said trough, the roller or rollers, and the scraper or scrapers thereof, as specified.

We also claim the arrangement of the auxiliary rollers, R R, with the main rollers, B C, their scrapers, and mercury trough, as explained.

We also claim the combination as well as the arrangement of the riffle, O, with the trough, D, one or more rollers, B C, and one or more scrapers, N N.

We also claim the combination of mechanism for imparting to either or both of the rollers, B C, endwise movements under circumstances as set forth, with such rollers, the mercury trough, and the scrapers or their equivalents, the whole being substantially as specified.

65,594.—BLAST APPARATUS FOR CARBURETERS.—F. S. Pease, Buffalo, N. Y.

I claim the arrangement of the shaft, A, cams, B B, dividing the circle and operating the bellows of corresponding numbers, which are adjusted as to capacity by the check string, c, the whole constructed and operated substantially as described and represented.

65,595.—BLAST APPARATUS FOR CARBURETERS.—F. S. Pease, Buffalo. N. Y.

First, I claim the double bellows, A, so constructed that the sections are reciprocally operated by the same impulse from crank or eccentric on a rotary or vibrating shaft, substantially as described.

Second. The combination of the rotary or vibrating shaft, G, provided with cranks or eccentrics, the connecting rods, H, and series of double bellows, A A, substantially as described.

65,596.—SHIRT BOSOM.—George B. Perkins (assignor to Burlock Manufacturing Company), Bridgeport, Conn.

I claim a bosom attached to the shirt over the bosom proper thereof, expanding in width from its attachment to the collar band, and narrowing in its approach to the waist, as shown, and strengthened longitudinally by cording, all substantially as described.

65,597.—CONSTRUCTION OF POTS FOR CHARRING OR BURNING BONES.—C. W. Pierce, Albany, N. Y.

I claim in the construction of pots for use as described, the division of the bottoms of the pot into parts, separated from each other by slots, constructed and arranged as described and for the purposes set forth.

65,598.—HARDENING SAWS.—Edwin S. Piper (assignor to himself and Atkins and Company), Indianapolis, Ind.

First, I claim the preventing of springing of saws during the process of hardening.

Second, The construction of the clamps.

Third, The combination of the lever, N, cam, M, hook, K, rim, L, double hook, T, plunger, G, and knuckle joints, H H, with the clamp, D, and clamp, F, all arranged and operating substantially as set forth and for the purpose described.

65,599.—HOT-BLAST STOVE.—John Player, Norton, England.

I claim the constructing and arranging of a hot-blast stove to be used with coal or solid fuel, with three distinct chambers, in the manner herein described.

Also the use in conjunction therewith of a steam jet as herein described.

I also claim the use of a steam jet, to draw down the gases from the top of the blast furnace and to force it into the stove for heating the blast.

65,600.—APPARATUS FOR HEATING THE BLAST FOR FURNACES USED IN SMELTING IRON, ETC.—John Player, Norton, England.

I claim the constructing or arranging of a hot-blast stove in the manner herein described, whereby the waste gases are ignited and consumed in a chamber separate from a the chamber within which the pipes are contained.

65,601.—HINGE.—Jay W. Powers, Evanston, Ill. Antedated May 28, 1867.

I claim the cam, D, applied to a triplicate hinge, constructed and operating substantially as and for the purposes herein set forth.

65,602.—CAR COUPLING.—Stephen Puffer, Oxford, N. Y.

First, I claim the combination of cams, c, with the pivot ends of a detachable swivel-jointed coupling link, E, when said ends are so arranged as to be struck by the collision of the cars when thrown back upon the bumper.

Second, I also claim the combination of a detachable bumper block with either bumper of a railway car, and with a swinging coupling link, all substantially in the manner and for the purposes set forth.

65,603.—FERRULE FOR STOPPING LEAKS IN BOILER TUBES.—Patrick Quinn, South Newmarket, N. H.

I claim the gland and the expander as made not only with the male and female screws, and with either or both tapering, as specified, but as having a keyhole formed in the bore of the expander, as set forth.

65,604.—FORMING PROJECTIONS ON THE CAPS OF PLANE IRONS.—N. B. Reynolds, Auburn. N. Y.

I claim the method of construction substantially as described.

65,605.—SNOW PLOW.—Samuel Richards, Philadelphia, Pa.

I claim the combination of the inclined plane, A A', and the movable wedge block, B, and the pivoted flap, c, arranged and operating substantially as described.

65,606.—LET-OFF FOR LOOMS.—George Richardson, Lowell, Mass.

I claim the combination of the whip roll finger, e, tension rod, f, tension spring, k, grooved or equivalent shaped wheel, o, and strap or band, n, arranged and operating together substantially as and for the purpose herein specified.

I also claim the combination of the cam, h, adjustable finger, g, rod, f, and strap, n, for producing a positive stop to the let-off motion while beating up the woof, substantially as herein specified.

65,607.—BREECH-LOADING FIRE-ARM.—B. S. Roberts, United States Army.

First, I claim the combination with a breech piece, B, which springs about a curved abutment, c, a rocking block, g, so applied to said breech piece as to allow of the opening and closing of the breech of the barrel for the insertion or withdrawal of a cartridge substantially as described.

Second, The lever, B', formed on the rear curved end of the swinging breech piece, B, and adapted to move about the solid abutment, c, in combination with a rocking block, g, which will admit of the opening and closing of the breech, substantially as described.

Third, I claim the groove, m, in the rocking block, g, operating on the lever at the shoulder, n, so as to extract the cartridge, substantially as described.

65,608.—METHOD OF HANGING WINDOW SASH.—William Robertson, Plymouth, Ind.

I claim the pulley block, F, when constructed and arranged substantially as and for the purpose set forth.

65,609.—LUBRICATOR.—Robert Ross and B. E. Lehman, Bethlehem, Pa.

First, We claim the combination of the spindle, D, its valve, f, cap, k, spring, m, projection, n, and passages, p p', the whole being constructed and arranged in respect to the mouth and reservoir of the oil cup, substantially as and for the purpose herein set forth.

Second, The combination of the above and the hollow spindle, D, its vent hole, b, and the set screw, F, for the purpose specified.

Third, The ring, C, resting with its notched under edge in the mouth, A, and forming a rest for the spring, I, all as set forth.

Fourth, The detachable annular strainer, H, constructed and combined with the ring, C, spindle, D, and spring, I, as described.

65,610.—SEEDING MACHINE AND FERTILIZER.—A. P. Routt, Liberty Mills, Va.

First, I claim the furrowing tooth, C, having the broad reversible plate or shovel, w, and the brace, v, substantially as and for the purpose specified.

Second, The agitator, M, in the fertilizer box, having the arms, z z' z'' z''' substantially as and for the purpose described.

Third, The construction of the conducting tubes, feed box, and distributing roller in such a manner as to show at S the distributing roller, N, and the interior of the conducting tube, H, substantially in the manner and for the purpose specified.

65,611.—SCUTTLE DOOR FOR BUILDINGS. DRY DOCKS, AND VESSELS.—Joseph Ryan, St. Louis, Mo.

I claim the combination and arrangement of a scuttle door, B, having one or more fire safety openings, d', and conducting and distributing hose or pipes, d2 d3 d4, with decks, ropes, etc., substantially in the manner and for the purposes herein set forth.

65,612.—BRICK MACHINE.—Henry C. Sergeant, Columbus, Ohio.

First, I claim lowering the followers at intervals, or continuing the lowering while under the pug mill as the molds are being filled to facilitate the filling of the corners of the molds.

Second, I claim the adjustable striker plate, having a bolt or slot for clamping, as shown and described.

Third, I claim the arm, D, having an intermittent motion in combination with the rise in the track, as shown and described.

Fourth, I claim the pins or projections on the rim of the mold wheel for giving motion to a pressure plate or arm, D, or its equivalent, as shown and described.

65,613.—BRICK MACHINE.—Henry C. Sergeant, Columbus, Ohio.

First, I claim the weight E, with its arm when made to hinge and turn upon the shaft of the mold-wheel for the purpose specified.

Second, I claim the inclined tracks when attached to the periphery of the mold wheel for raising or dropping a weight upon the face of the brick for finishing, as shown and described.

Third, I claim the arm, toe, and incline on the end of arm for facilitating the raising and getting the weight back to its place.

Fourth, I claim the stop, l, attached to the arm or weight, E, when operated to drop into holes or notches for the purpose of preventing the weight from sliding on the brick when being raised up, as shown and described.

65,614.—COVER FOR GRIDIRONS.—Reuben Shaler, Madison, Conn.

I claim a cover having an opening, C, and protected from below by a plate, D, substantially as and for the purpose specified.

65,615.—BUTTON-LACING HOOK.—William H. Shurtleff, Providence, R. I. Antedated May 9, 1867.

First, I claim making a button hook in which the hook is within the periphery of and eccentric to the bottom of two, separate and distinct, united together at or near the center of the button, substantially as herein shown and described.

Second, As a new article of manufacture, I claim a lacing hook and button, in which the button is made of horn, hoof, rubber, or other like material, and the hook of metal, the two being combined together substantially in the manner herein shown and described.

65,616.—PLATE LIFTER.—Daniel M. Skinner, Sandwich Centre, N. H.

I claim the plate lifter made as described, viz.: of a wire bent as shown at a b c d f g h i k l, so as to form the elastic handle portion, A, and two open jaws, B B, as represented.

65,617.—CAP FOR UPHOLSTERER'S SPRINGS.—Ambrose Tower, New York City.

I claim a grooved metallic cap for upholstery springs, having arms, A and B, eyes, G, and attachments, D, constructed and arranged substantially as herein specified.

65,618.—TART CUTTER.—John H. Treadwell, Swampscott, Mass.

I claim the tart cutter, as made with the die, C, and the cutter box, A, arranged as specified.

I also claim the combination of the handle, B, the cutter box, A, and the die, C, arranged as specified, the said box being provided or not with air holes as described.

65,619.—GATE.—H. B. Van Voorhis, Pittsburg, Pa.

First, I claim the combination of the slotted plate, A, slotted lever, B, and pin, C, substantially as and for the purpose set forth.

Second, The combination of these devices with the catches, L and N, as and for the purpose set forth.

65,620.—CHURN.—Aaron Votaw, New Garden, Ohio.

I claim the arrangement of the breakers, E, and ribs, H I, in combination with the case, C, when operated in the manner and for the purpose, substantially as set forth.

65,621.—LAMP FOR BURNING OFF PAINT.—William W Wakeman, Jr., New York City.

First, I claim the reservoir, A, placed over the lamp, L, substantially as and for the purposes herein set forth.

Second, The expanded mouth, G, of the pipe, F, or its equivalent, substantially as herein described.

Third, The independent lamp, L, operating substantially as and for the purpose herein specified.

65,622.—WAGON AXLE AND BOX.—John N. and Theodore Wallis, Fleming, N. Y.

First, We claim the collar, D, in combination with the thimble, E, and box, B, when all are constructed, arranged, and operated substantially in the manner and used for the purpose specified.

Second, Securing the sand band, C, to the box, B, as and for the purpose specified.

65,623.—CHURN.—Chauncey E. Warner, Syracuse, N. Y.

First, I claim the hinged beaters, e f, in combination with the shafts, B C, and gears, b c D, all constructed and operating as and for the purpose herein shown and described.

Second, In connection with the above, I claim also the sliding hub, m, for adjusting the upper beaters to varying quantities of cream, as and for the purpose set forth.

65,624.—FOOT SCRAPER.—James Whait, Springfield, Mo.

I claim the hinged hollow sides, D D, in combination with the scraper, B, all constructed and arranged as and for the purpose set forth.

65,625.—WATER ANCHOR.—Norman W. Wheeler, Brooklyn, N. Y.

First, I claim the water anchor herein described, when the ropes, f f, are so arranged in reference to the cross pieces, C D, as to expand the anchor by their tension, in the manner and for the purposes described.

Second, In combination with the above, the spilling line attached, and operating substantially as and for the purposes described.

Third, The combination of the weight, l, canvas, E, and cross pieces, A A, when arranged in the manner described.

65,626.—DISH COVER.—William H. White, Kent Island, Md., assignor to himself and George W. White.

I claim the combination of a skeleton frame and a fabric cover, when the former is shaped and constructed to hold in place a fabric cover, and the latter made detachable from the frame, for the purposes herein shown and described.

65,627.—QUILTING FRAME.—Aaron S. Winner, Clark Co., Ill.

I claim the construction of the self-supporting trestles or benches with the gains, in combination with the wheels and catches, arranged in the manner and for the purpose described.

65,628.—PAPER REEL FOR TELEGRAPHIC REGISTER.—Lewis W. Worth, Sonoma, Cal.

I claim the rails, B C, adjustable drum, F, with ratchet, P, pawl, R, and spring, S, with cord, L, arm weight, W, for the purpose herein specified as set forth.

65,629.—BEEHIVE.—William J. Andrews, Columbia, Tenn.

First, I claim the semicircular pieces, F F, the movable covers or caps, G G, and the upright bar, H, when used in the manner and for the purpose as herein specified.

Second, I claim the moth trap, K, when it is provided with the grated cover, I, and feeding trough, L, arranged in the manner and for the purpose specified.

65,630.—CHECKING THE DRAFT IN FURNACES.—Jonas C. Bognall, St. Louis, Mo.

I claim the arrangement of a door, b, in the smoke stack of a reverberatory furnace and above the reverberatory line thereof, substantially as and for the purpose described.

65,631.—COMBINATION SQUARE.—D. A. B. Bailey, St Johnsburg, Vt.

I claim the frame, B B', the face pieces, D, the circle, E, and the points, g g, the whole constructed, arranged, and held in position substantially as herein shown and described, in combination with the square, for the purposes set forth.

65,632.—BAG FASTENER OR TIE.—D. B. Baker, Rollersville, Ohio.

I claim the metallic clasp for bags, constructed as described, consisting of the semicircular parts, A A', whose wide sides rest against the bag, connected at one end by the link, B, the opposite ends fastened by means of the triangular projections, b, catching into the perforations, c, the part, A, provided with the finger rest, d, as herein shown and described.

65,633.—VELOCIPEDE SLED.—John Bannihr, Hempstead, N. Y.

I claim the claws, n, pivoted on wheel, C, on each side of a sled, in combination with the levers, D, or their equivalent, for rotating the wheels, constructed and operating substantially as herein set forth.

65,634.—HOSE CARRIAGE.—N. S. Bean, Manchester, N. H.

First, I claim, in combination with the reel and its shaft, a winding shaft, i, arranged upon the frame, a, and connected to and rotating the reel shaft through the pulleys and their chains, substantially as shown and described.

Second, The arrangement of the reel shaft in bearings directly on the frame, a, and directly over the carriage axle, when such axle is bent to permit the reel heads to run free from the same, substantially as set forth.

Third, The construction of each reel head of a concave disk, having shrunk upon the perimeter thereof a grooved ring or tire, substantially as shown and described.

Fourth, In combination with the reel the fuel boxes arranged on each side thereof, and under the frame of each box, having a discharge opening and a gate in in its bottom, substantially as set forth.

65,635.—BRICK PRESS.—Christopher Becker, Flint, Mich.

I claim a brick press, consisting of a combination of the box, A, block, B, plungers, D D', and sliding covers, H H', with each other, and with a suitable mechanism for operating the same, all made substantially as herein shown and described, and operating in such a manner that the bricks are pressed alternately in the molds, G G', as set forth.

65,636.—CORSET.—Myron H. Beckworth, Camden, N. Y.

I claim a belt applied over and upon the seam around the waist part of the corsets, substantially as and for the purposes set forth.

65,637.—BLACKING DISH AND KNIFE.—E. L. Bolster, Waterbury, Conn.

I claim a dish provided with a knife or cutter blade substantially as and for the purpose described.

65,638.—WIRE CUTTING PINCERS.—Peter Broadbooks, Batavia, N. Y.

I claim the legs, b, b', and spring, d, secured together by means of the rectangular collar, a, fitting over and working upon the heads, c, c, of the legs, b, b, and spring, d, the latter connected to the leg, b,' by means of the knuckle joint composed of the knuckle, g, and socket, h, all constructed and arranged substantially as described for the purpose specified.

65,639.—METALLIC SURFACE COATING COMPOSITION.—G. Brown, E. E. Burnham, and J. Morrise, Gloucester, Mass.

We claim the composition made substantially in manner and of the ingredients set forth, and we especially claim its combination with naphtha or the equivalent thereof, the whole being substantially as and for the purpose as hereinbefore specified.

65,640.—DIVAN AND BED.—Henry Buehler, New York City.

I claim a divan constructed substantially in its seat and back portions so as to be used and adjusted substantially as described for the purposes specified.

65,641.—DIES FOR FORMING THILL COUPLINGS.—L. Burns, (assignor to himself and Joseph Wilcox,) Portchester, N. Y.

First, I claim the thill coupling constructed as described, by swaging the blank, A, in the dies, D, E, and M, N, as herein shown and described for the purpose specified.

Second, the dies, D, E, provided with the holes, F, and opening, H, the dies, M, N, with equal shoulders, L, all constructed as described for the purpose of forming the thill coupling substantially as herein set forth.

65,642.—METHOD OF FORMING WHEELS, TIRES &c., BY CASTINGS.—William Butcher, Jr., Sheffield Eng., Thomas Shaw, Philadelphia, Pa.

First, We claim as our improvement, the method of forming tires, wheels and other articles of metal by casting, supporting the mold whilst the melted metal is being poured into it, upon being unconfined to a revolving disk, substantially as and for the purposes specified.

Second, In combination with a mold and revolving disk as set forth in the foregoing clause we claim the two rings, h, and i, or their equivalents substantially as and for the purposes specified.

65,643.—COTTON GIN.—Jules Alfred Chaufourier, Paris, France.

First, I claim the self-feeding apparatus consisting of the racks or combs k, N, and P, and the manner of operating the same substantially as shown and described.

Second, The self operating refrigerator or bellows, I, for the purpose of conducting a current of air towards the driving or carrying cylinder, H, substantially as herein shown and described.

Third, One or more supporting cylinders R, for the purpose of preventing a deflection of the shelling cylinders substantially as herein shown and described.

65,644.—TOY ROPE DANCER.—Dominico Cheekeni, Brooklyn, N. Y. Antedated June 5th. 1867.

I claim the lever, E, the bells, H, the rope, D, and figure, I, (or its equivalent) in combination with the cross trees, B, B, and platform, A, substantially as and for the purposes described and set forth.

65,645.—SASH LOCK.—Charles B. Clark, Buffalo, N. Y.

First, I claim the combination of the eccentric roller, D, for sustaining the sash, with the weighted roller, F, and case, C, for holding the sash up and locking the same down, substantially as described.

Second, In combination with the eccentric roller, D, the hollow cylindrical stud, E, forming a portion of the case and receiving the screw, e, arranged substantially as and for the purposes set forth.

65,646.—STEAM TRAPS.—Richard Colburn, Norwich, Conn.

I claim the arrangement of the valve, its case, and induction and eduction passages substantially in manner as described, in order that the valve when in use with a cylinder and piston as explained, will be closed by the pressure of steam and when relieved therefrom will be opened by its own weight, the whole being in manner and under circumstances as explained.

I also claim the combination of the screw, l, or its equivalent with the valve, its seat, chamber, and induction and eduction passages arranged substantially as explained.

64,647.—COTTON SEED PLANTER.—J. A. Cox, Humbolt, Tenn.

First, I claim the combination with the seed box, E, and hopper, F, of the colter, C, and opener, D, substantially as and for the purpose set forth.

Second, The combination with the colter, C, and opener D, of two harrow teeth, J, J, substantially as and for the purpose specified.

Third, The combination with the opener, D, and hopper, F, of the coverer, I, substantially as and for the purposes herein above set forth.

65,648.—WELL TUBE.—S. F. Craig, Eddyville, Iowa.

I claim the combination and arrangement of the perforated end, A, of the well tube, around which the wire screen or ganze, B, is placed, point, D, secured to the end of said tube, forming the chamber, E, and air passage, G, as herein set forth, for the purpose specified.

65,649.—ROTARY DOUGH DRESSER.—George H. Cross, Montpelier, Vt.

I claim the revolving brush, A, upon the shaft, b, b, in combination with the box, B, adapted for dressing dough to prepare it for the manufacture of crackers, as herein shown and described.

65,650.—SPINNING FRAME.—J. E. Crowell, Chelsea, Mass.

I claim in combination with the flyer of a spinning frame, drawing rolls arranged within the flyers, when one of said rolls in each flyer is directly upon the spindle and meshes into and drives the others, substantially as shown and described,

I also claim combining with the drawing rolls, and the flyer of a spinning frame, a detainer bar interposed between the drawing and twisting mechanism and the delivery rolls, substantially as and for the purpose described.

65,651.—WOOD SCREWS.—George C. Davis, (assignor to the Davis Screw Company,) Dayton, Ohio.

First, I claim making wood screws with a tapering core from neck to point, with threads of equal pitch and external diameter, but of gradually but more rapidly increasing depth from the base to near the apex of the said core, where they again diminish and die out into a central point.

Second, Making wood screws with a core tapering from its base to its point, with threads of equal pitch and external diameter but of gradually increasing depth from its base to near the point where it again diminishes and dies out in combination with a shank with parallel sides or tapered from about its centre where it joins the core substantially as set forth.

65,652.—MACHINES FOR MAKING CLASPS FOR HOOP SKIRTS.—Adolph Delkescamp, (assignor to John A. Newbould,) New York City.

I claim the swinging bending bar, o, in combination with the slide, i, dies, d, and n, and punch, e, substantially as and for the purposes set forth.

65,653.—NAPKIN HOLDER.—William L. Dewey, Bridgeport, Conn.

I claim as a new article of manufacture a napkin holder constructed as described consisting of the pedestal, A, into which are screwed or riveted spring arms, B, in one piece and forming nearly a circle with their ends bent over at D, as herein shown and described.

65,654.—COMPASS USED IN CALKING SEAMS.—George Dowling, Fair Haven, Conn.

I claim in combination with the compass, A, the additional or adjustable leg, f, and adjusting arc d, when constructed and operating substantially as described.

65,655.—COTTON PRESS.—James E. Duvoll, Sardis, Mississippi.

I claim operating the follower or plate, H, through which the medium of the ropes, E, I, K, applied in connection with the wheel and shaft, C, D, and the capstan, F, all arranged to operate in the manner substantially as and for the purpose set forth.

65,656.—EVAPORATING PANS.—S. P. Dyer, Prairie Depot, Ohio.

First, I claim the skimmers C, constructed arranged and operated substantially as herein shown and described, and for the purpose set forth.

Second, The combination and arrangement of the strainer, G, gates, H, R, S, T, and operating levers, I, L, M, N, with the partitions, G, U, V, M, of the pan substantially as herein shown and described and for the purpose set forth.

Third, The combination of the stationary strainer, A', with the finishing pan, X, substantially as herein shown and described and for the purpose set forth.

Fourth, The arrangement of the dampers, G', H', I', and flue partitions, E', F', with each other substantially as herein shown and described and for the purpose set forth.

65,657.—PREVENTING INCRUSTATION IN STEAM BOILERS.—Charles James Eames, New York City.

I claim the mode of preventing the incrustation in steam boilers substantially as herein described.

65,658.—MANUFACTURE OF REFINED SUGAR.—Edward P. Eastwick, Baltimore, Md.

I claim the mode substantially as herein described of obtaining from sugar of one quality, solutions of different qualities for the purpose specified.

65,659.—ROAD SCRAPER.—N. Evinger, Sand Ford, Ind.

First, I claim the combination and arrangement of the scraper plate, A, beams, C, chain, D, draft bar, E, and connecting bar, L, with an ordinary plough, N, substantially as herein shown and described.

Second, The combination of the pivoted arm, H, and caster wheel, G, with the beam, C, substantially in the manner herein shown and described and for the purpose set forth.

Third, The combination of the lever, R, with the plow beam, m', and draft bar, E, substantially as herein shown and described and for the purpose set forth.

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65,660.—COMPOSITION FOR PAVEMENT.—W. P. Ford, and A. A. Moore, Concord, N. H.

We claim a composition for pavements, &c., made up of the specific ingredients combined together, substantially as set forth.

65,661.—ANIMAL TRAPS.—A. Frost, Seymour, Ind.

First, I claim the plate levers, a, a', constructed and arranged so as to open or close simultaneously the doors, b, b', substantially as set forth.

Second, The doors, b, b,' provided with loops, i, i, in combination with levers, a, a', as and for the purpose set forth.

Third, The spring platform or treadle, d, provided with slot, o, for engaging with the lever, a', as and for the purpose described.

65,662.—MOP HEAD.—O. S. Garretson, Buffalo, N. Y.

I claim the jaw frame and socket, C D, composed of a single piece of malleable metal in combination with the cross head, B, and screw shank, A, or its equivalent, when said jaw and socket have a reciprocating movement in consequence of the revolving of the socket, or of a nut connected therewith, or of the screw within the same substantially as herein described.

65,663.—SCARF SUPPORTER.—D. George, Boston, Mass.

I claim a scarf or neck tie supporter, constructed to operate substantially as set forth.

65,664.—MANUFACTURE OF STARCH.—J. J. Gilbert, Little Falls, N. Y.

First, I claim the separator, D, constructed and arranged substantially as herein shown and described for the purposes set forth,

Second, I claim the depositor, H, constructed substantially as described for the purposes set forth,

Third, In combination with the separator, I claim the vats arranged substantially as described and for the method herein described of manufacturing starch.

65,665.—TREADLE MECHANISM FOR SEWING MACHINES.—William Smith Hall, Quincy Mass.

I claim combining a machine shaft with a treadle by a ratchet, pawl-lever and connecting rod, arranged to operate together, substantially as described.

I also claim the double sets of treadle levers, pawl levers, pawls and ratchets, arranged to operate both independently or in conjunction, substantially as set forth.

65,666.—EXTENSION HORSE.—R. Hammill, Mineral Point, Wis.

First, I claim the manner of attaching the folding legs, A, A, to the beam, B, of a horse or trestle, by means of slotted pins, b, staples, c, and keys, d, all made and operating substantially as herein shown and described.

Second, The extension beam, B, in combination with the legs, A, D, all made and operating substantially as herein shown and described.

Third, The braces, C, and E, in combination with the legs, A, and beam, B, made so as to be folded to the beam and legs if desired as set forth.

Fourth, Connecting and supporting the inner ends of the two halves of the extension beam, B, by means of bands, a, and a tongue, h, which is provided with pins, i, i, and which is confined in grooves, g, between stops k, substantially as set forth.

Fifth, An extension and folding horse or trestle made and operating substantially as herein shown and described.

65,667.—STEAM HEATING APPARATUS.—S. T. Harker, Milwaukee, Wiss.

I claim a steam heating apparatus consisting of fire chambers, A, with coil C, on three sides, water and steam dome, B, on the fire chamber with a smoke passage through it large at the bottom and contracted at the top, and both ends of the coil C entering the dome below the water line, all arranged and combined substantially as described.

65,668.—WOOD SCREWS.—Harvy J. Harwood, Utica, N. Y.

First, I claim forming the end of the screw into a lip or lips substantially as described.

Second, Extending the lip or lips of the screws beyond the terminus of the core substantially as described.

Third, Retaining the full size of the screw at the point without continuing the core to the point.

Fourth, Increasing the pitch between the lip and first thread substantially as described.

65,669.—SAWING MACHINES.—Henry Hassenpflug, (assignor to himself and Edward Hassenpflug,) Huntington, Pa.

I claim the arrangement of the lever, m, plate n, shaft, i, levers, j, k, and I, by which motion is imparted from the shaft, C, to the receprocating G, as herein set forth for the purpose specified.

65,670.—FIELD FENCE.—Joel Heacock, Marlboro, Ohio.

I claim the combinatien and arrangement herein described of the rails, A, A, battens, B, B, braces, C, and sill, D, when all are constructed of the ordinary split rails to form the panels of a field fence, substantially in the manner and for the purpose set forth as described,

65,671.—BUTTON HOLE CUTTERS.—Herrman Hempel, New York City.

I claim the sliding block, D, when secured to the jaw, d, by means of straps, g, g, and when held in position by a spring catch, h, fitting into one of a series of holes arranged on one side of the jaw, d, all as set forth.

65,672.—ROSETTES.—F. L. Hilbright, and F. Reynold, Newark, N. J.

I claim the die, A, consisting of the part, B, fixed to the flanged rod, the part, C, hinged to the part, B, their pieces in contact with each other constructed to receive and hold the metallic loop of rosettes, said die, A, being brought down upon the rosette in the lower die and uniting the loop thereto, as herein set forth for the purpose specified.

65,673.—ELASTIC FRAME FOR MOSQUITO BAR NETTING.—R. M. Holland and A. J. Hibbs, Philadelphia, Pa.

We claim the socket pieces, A A, with their enclosed springs, B, together supporting the stems, C C C C, elastically, in combination with the listing, D, or its equivalent for holding the musquito netting, E, the said parts being constructed and arranged to operate together substantially as and for the purpose described.

65,674.—COMPOSITION FOR HARDENING AND PRESERVING WOOD.—H. L. Houghton, Morrison, Ill.

I claim a wood preserving composition formed of the ingredients herein named and in about the proportions mentioned and applied to wood, substantially as herein described.

65,675.—QUARTZ MILLS.—W. W. Hubbell and J. M. Patton, Philadelphia, Pa.

We claim, First, The edged toothed sections or plates, p, firmly bolted and fitted to the rectangular surfaces or corners of the pot, and used in combination with the central revolving nuts, diminishing in their size and increasing in their number of teeth downward towards the bottom of the pot substantially as described.

Second, Discharging the ground quartz from the bottom of the pot, e, into the inclined conduit by means of the arm, n, attached to the rim or collar, m, and below the teeth, l, and plates, p, substantially as described.

Third, The series of circular movable toothed sections or nuts above each other vertically, the teeth of the separate nuts diminishing in size, but increasing in number as they are placed one below the other when used in combination with the interior vertical toothed plates, p, within the pot, constructed and operating substantially as described.

Fourth, The furrows in the stones cut in two distinct series, the inner series upon radial lines extending outward to or near the half diameter of the stone, the outer series in toward the centre, on lines tangential to the inner furrows, and entirely separate and distinct from each other, with a plain attrition or uncut face between them, substantially as described.

Fifth, In a mill for grinding quartz we claim the combination of the elevated pot, e, with its plates and nuts, arms, n, aperture, 22, inclined conduit, 1, and the lower stones, y z, constructed, proportioned and operating substantially as described.

Sixth, The removable steel cup or shoe, 19, constructed, applied and used between the vertical shaft and removable step, 21, in the manner and for this purpose as described.

65,676.—SCREW BOX FOR VISES.—A. Jameson, (assignor to himself, T. S. Murray, and J. H. Murray), Trenton, New Jersey.

I claim the method substantially as above described, of making screw boxes for vises.

65,677.—MODE OF DISINTEGRATING ROCKS.—John Johnson Saco, Maine, and R. C. Overton, New York City.

We claim liquid and gaseous hydro-carbon and air, or air and steam as fuel, for the purpose herein set forth, and when employed with the agents for the reduction of temperature substantially as specified.

65,678.—WRENCHES.—G. B. Keeler, Greenwich, Conn.

I claim the shank or bar, A, notched at one end, in combination with the adjustable spring hook, F, substantially as and for the purpose described.

65,679.—WRENCHES.—Dennis A. Kellogg, Valparaiso, Indiana.

I claim a wrench constructed, arranged and operating as and for the purpose herein set forth.

65,680.—CEMENT FOR FIXING DOOR KNOBS.—Patrick Kennedy, New York City.

I claim a cement composed of the ingredients substantially in the manner herein set forth.

65,681.—WAGON SPRINGS.—Garret C. Lansing and John G. Ostrom, Rhinebeck, N. Y.

We claim the flat wooden springs, a a' a" a"', etc, when arranged in pairs, each pair at right angles across the other, substantially as and for the purpose herein shown and described.

65,682.—AUTOMATIC FIRE EXTINGUISHER.—Rufus Lapham, New York City.

I claim, First, The application of the expansion of mercury by the heat produced by the breaking out of a fire in a room to cause an alarm to be given.

Second, The application of the expansion of mercury by the heat produced by the breaking out of a fire in a room to cause chemicals that produce carbonic acid gas to be brought together for the purpose set forth.

Third, The application of the expansion of mercury by the heat produced by the breaking out of a fire in a room to cause a cock or its equivalent to open for the purpose of letting in an extinguisher agent kept in reserve.

Fourth, The application of the expansion of mercury by the heat produced by the breaking out of a fire in a room, to sever a wire or its equivalent with which mercury readily amalgamates for the purposes set forth.

Fifth, I claim generally for all purposes to which it is adapted, arranging a wire or its equivalent with which mercury readily amalgamates, in such a relation to the mercury that when expanded by heat it shall unite with said wire or its equivalent, and cause it to be separated.

65,683.—CARPET CLEANER.—Theodore Luke, St. Louis, Mo.

I claim the combination of the frame, b b, shaft, a, revolving arms, h, rotary brush, e, and windlass, k, as herein described and for the purpose specified.

65,684.—PUMPS.—Alexander Moon, Maquoketa, Iowa.

I claim the combination of the pumping cylinder or barrel, A, plunger, C, and tubes, D and J, when all constructed with valves and arranged together so as to operate substantially as and for the purpose described.

65,685.—SKATES.—H. C. Moore, (assignor to himself and Charles Robinson, Springfield, Mass.

I claim the hook notches, l l, in the adjacent edges of the flanches of the toe clamps in combination with the thumb screw, S, which holds the flanches together, substantially as and for the purpose specified.

I also claim the combination of the hook notches, f f, in the edges of the flanch of the heel clamp, the corresponding notched opening in the heel plate, D, the bolt, g, and nut, t, substantially as and for the purpose herein specified.

Also claim the notched eccentric, G, with its handle, p, turning up and down under the foot, and arranged so that it tightens more securely as the heel tends to work out, substantially as herein specified.

65,686.—CARPET STRETCHER AND HOLDER.—J. S. Mungen, Olean, N. Y.

I claim, First, The pointed dogs, B, adapted for use in the operation of stretching carpets, and constructed substantially as described.

Second, The combination of hooked holding plates, A, with curved dogs, B, substantially as described.

65,687.—SAWS.—James Neale, Trenton, N. J.. assignor to himself and Mathew T. Higgins, New York City.

I claim a saw tooth formed with a dove-tailed base and grooved back setting wit in the recess of the saw plate, and secured by the clamping plate, D, within a recess at the front portion of the base of the tooth in the manner set forth.

65,688.—LINIMENT.—Rachel Newcomb, South Brooklyn, N. Y.

I claim the liniment made of the ingredients mixed together in and about the proportions herein above described.

65,689.—SLEIGH BELLS.—W. H. Nichols, East Hampton, Conn.

I claim casting a shank of two or more or less pins, a a, in and with the sleigh bell, A, substantially as and for the purposes herein shown and described.

65,690.—PUMPS.—Hiram Parks, Athens, N. Y.

I claim the arrangement of the pump, A, sinker, H, piston rod, B, crank or elbow pieces, C C, wires or rods, D, and lever, E, as herein described, operating as and for the purpose specified.

65,691.—KEEL, BLOCK, or REST.—Joseph Thomas Parlour, Brooklyn, N. Y.

First, I claim a block or support for the keel of a vessel, etc., when made in separate parts or sections, constructed and arranged together so as to be operated substantially as and for the purpose described.

Second, The upper or cap section, B, of a keel block, so arranged that as it is raised or lowered it will move and be guided in a vertical plane or direction substantially as described.

65,692.—ROLLING SCREEN FOR DOORS AND WINDOWS, ETC.—William G. Perkins, Walden, Vt.

I claim the winding screen made up of slats with edges as described when arranged on suspensories as specified.

65,693.—MEDICAL COMPOUND.—H. G. Pope and H. F. Herrick, New Berlin, N. Y.

We claim a medical compound made of the ingredients mixed together in and about the proportions, substantially as and for the purpose described.

65,694.—FENCE.—Esek C. Roberts, Salem, Mich.

I claim the combination of the top rails or riders, E, with the stakes, B and C, substantially in the manner herein shown and described and for the purpose set forth.

65,695.—POTATO PLANTER.—John P. Scudder, Lawrenceville, N. J.

First I claim the inclined cylinder, E, in combination with the revolving scoops, g, and adjustable valve, H, all made and operating substantially as herein shown and described.

Second, The hopper, N, and gate, h, in combination with the inclined cylinder, E. scoop, g, and valve, H, all made and operating substantially as herein shown and described.

Third, the adjustable plow, J, in combination with the inclined cylinder, scoops, g, and valve, H, all made and operating substantially as herein shown and described.

65,696.—LAMP EXTINGUISHER.—Edward Shaw, Portland, Maine.

I claim the curved extinguisher for lamp of the kind described when constructed and applied as and for the purposes set forth.

65,697.—STEAM ENGINE GOVERNOR.—J. W. Shirley and William H. Fasig, Terre Haute, Ind.

I claim the wind wheel, A, the shaft, B, and the spring, F', arranged and operating substantially as herein shown and described for the purposes set forth,

65,698.—LANTERN LAMP.—Jacob Silvins and William F. Hain, Sunbury, Penn.

We claim the crust remover, g, on the upper end of a vertical shaft, E, which passes through a tube, F, in the lamp, substantially as and for the purpose specified.

65,699.—APPARATUS FOR TEMPERING WIRE.—P. L. Slayton, (assignor to himself and Almet Reed), New York City.

First, I claim the radially adjustable strips or bars, E, arranged between the guide bars, C, and provided with holes or gas passages, c, communicating with recesses, e, in the guide bars, C, all arranged substantially in the manner as and for the purpose set forth.

Second, The central passage formed by the strips or bars, E, of such a size as to receive the wire to be tempered, and to permit a current of air to pass to the gas jets, and this I claim whether said strips, E, are adjustable or stationary.

65,700.—SLEIGH BRAKE.—William Sloan, Highland, Iowa.

First, I claim the jaws, E, pivoted to and straddling the runner, A, prong, G, and handle, F, when constructed and arranged as herein set forth for the purpose specified.

Second, Attaching an arm or prong, G, to the brake, E F, substantially as herein shown and described and for the purpose set forth.

65,701.—WINDOW SASH FASTENER.—Sherman Smith, Presque Isle, Maine.

I claim the combination of the bar, a a, the rack, c c, and the thumb screw, d, the wheel, g, on the plate, e, and the catch rod, i', arranged and operating as and for the purpose specified.

65,702.—SUGAR EVAPORATOR.—W. C. Smith, Warrensburg, Mo.

I claim the pans, F G H, arranged at different hights on the body, A, of the device when used in combination with the flues, J J' J", dampers, M M N O O, arranged relatively with the smoke-stack, K, and fire-box, B, substantially as and for the purpose set forth.

I further claim the adjustable wheels, C C, and folding legs or supports, D D, when used in combination with or applied to a sugar evaporator, substantially as and for the purpose specified.

65,703.—JIGGING MACHINE FOR DRESSING ORES.—William W. Spalding, Greenland, Mich.

First, I claim the main box, A, in combination with the plunger box, B, having a water passage or throat, a, connecting them, and divided into two compartments with the water passage, d, between them, and the discharge, pipes, e e', leading from them, arranged and operating substantially as and for the purposes herein described.

Second, The plunger, C, pivoted or hinged at one side, in combination with the box, B, the main box, A, and the sieve, b, arranged and operating substantially as and for the purposes specified.

Third, The combination of the closed ragging box, E, attached to the front side of the main box, A, the self-regulating gate, p, and the guard, F, constructed, arranged and operating substantially as and for the purposes set forth.

Fourth, The rake, k, in combination with the counter shaft, l, the crank shaft, h, and the sieve, b, arranged and operating as and for the purpose described.

Fifth, The combination and arrangement of the main box, A, the plunger box, B, the plunger, C, the bail, g, the apron, D, the rake, k, the guard, F, the gate, p, and the ragging box, E, substantially as and for the purposes herein described.

65,704.—BREECH LOADING FIRE-ARM.—R. E. Stephens, Owen Sound, Canada.

I claim, First, The construction and manner of operation in a breech-loading fire arm of the hammer, C, in combination with the cam rod, G, working by the double link, M,

Second, The construction of the extractor in two parts or sections, E F, in combination with the cam rod and springs, J S and X.

Third, The combination of the latch, O, and its operation automatically, and by the spring, x, and cam rod.

Fourth, The tripping box, I, and its notched key, H, operating therein in combination with the cam rod.

Fifth, The cam, P, in combination with the spiral shaped shoulder, Q, on the connecting rod, R, and working by the cam rod, in combination with the double link and hammer or its equivalent.

Sixth, The combination of the connecting rod, R, with the thumb bit, D, and breech block, A, and the spiral springs, J S and X, operating substantially as described and for the purpose set forth.

65,705.—APPARATUS FOR TREATING AIR AND HYDRO-CARBON VAPOR FOR ILLUMINATING GAS.—Levi Stevens, Fitchburg, Mass.

I claim the apparatus for treating air and hydro carbon vapor for illuminating gas, substantially as described and for the purposes specified.

Also I claim the combination of the float, k k, with the rod, a, and head, c, arranged substantially as described and for the purposes set forth.

Also I claim the use of alcohol for improving the quality of gas for combustion, in combination with the use of lime, substantially as described and for the purpases set forth.

65,706.—TACK HAMMER.—Thomas B. Stout, Keyport, N. J.

I claim the arrangement of the hammer head oblique to the handle, substantially as and for the purpose herein specified.

I also claim the claws arranged on the front side of the hammer head at the upper end thereof, and in line parallel with the handle, in combination with the oblique arrangement of the head and handle for the purpose set forth.

I also claim the combination of the oblique head and handle and magnetized claws, substantially as herein specified.

65,707.—FARM GATE.—John G. Talbot, Sloansville, N. Y.

I claim the single post, F, provided with the eye or socket, E D, and hook, J, and suspended roller or pulley, I, in combination with the gate, A B, the several parts being arranged and operating as and for the purpose set forth.

65,708.—BUTTON FASTENING.—John K. Underhill, Brooklyn, N. Y.

I claim the button, A, plate, B, and slotted plate, C, when the same are connected and combined with each other, and made and operating substantially as and for the purposes herein shown and described.

65,709.—PLOW.—F. Volkman, Hoboken, N. J.

First, I claim securing the upright screw shaft, D, in the axle, A, in the manner set forth, and clamping it by means of a set screw, a', and clamp, E, substantially as herein shown and described.

Second, The link, J, when arranged laterally adjustable on the plow beam substantially as herein shown and described, and for the purpose of changing the draft of the chain, I.

Third, The adjustable draft bar, G, when secured by a bolt, i, to the solid axle, A, and when connected with the draft chain, I, substantially as set forth.

Fourth, Securing the front end of the plow beam to a vertical rod, D, which projects from the axle of a cart, substantially as herein shown and described, the said rod not being secured or supported in any frame or other device that is arranged above the axle, A, and in contact with the same, substantially as set forth, and for the purpose of making the whole cart lighter and of simpler construction.

65,710.—BURGLAR ALARM.—Isaac M. Wells (assignor to himself and William Wood), Jeffersonville, Ohio.

First, I claim the post or shaft, B, wheel or disk, H, with cords, J, operating to free the verge wheel, M, as and for the purpose stated.

Third, In combination with the shaft, B, disk, H, cords, J, and pivoted lever, K, I claim the pin or pins, E, allowing the cords, G, to be self-detaching when they have performed their duty of starting the alarm.

65,711.—STOP MOTION FOR STEAM ENGINES.—Charles S. Westland, Providence, R. I.

First, I claim the combination of the air chamber, B, pipe, C, regulating cylinder, A, containing the piston, D, and spiral spring, E, piston rod, F with or without the sliding stop, c, and graduations, steam pipe, G, containing the valve, H, lever, J, double-slotted graduated arm, K, holding the adjustable index, a, and pipe, m, substantially as described for the purpose specified.

Second, The arrangement of the spring on the cylinder, communicating action to the piston by a ratchet wheel and pawl, as shown in Fig. 5. said ratchet wheel held in position by a dog, substantially as described and for the purpose specified.

65,712.—SKY LIGHT.—Horace Weston, Boston, Mass.

I claim forming grooves or gutters, a c, in the bars, B, and at the sides of the sash, substantially as and for the purpose described.

I also claim so forming or cutting away the upper surface of the bottom rail, D, that the moisture will run down into the grooves, a c, substantially as set forth.

65,713.—WASHING MACHINE.—E. F. Wheeler, Sag Harbor, N. Y.

I claim the slide, D, having prongs or fingers, E, projecting downward from its lower part, and rack teeth upon its upper part, in combination with the cover, C, lever, G, and box or tub, A, substantially as herein shown and described and for the purpose set forth.

65,714.—EVAPORATOR.—Samuel M. Williams, Pine Village, Ind.

First, I claim an improved evaporator formed by the combination of the pans, C D and E, with the furnace, A, when said furnace is constructed and arranged substantially as herein described and for the purposes set forth.

Second, The skimmer, F, formed by the combination of the perforated or wire-gauze plate, f', the handle, f3, and the sliding rod, f4, substantially as described and for the purpose set forth.

65,715.—DEVICE FOR CLEANING THE TRAPS OF WATER CLOSETS.—James Wright (assignor to himself and Francis Blessing), New York City.

First, I claim the flexible rod, E, when made as described, in combination with the tubular guide, B, and inflexible handle, C D, all made and operating substantially as and for the purpose herein shown and described.

Second, The friction rollers, F, in combination with the links, E, of the flexible rod, and with the handle, C D, all made and operating substantially as herein shown and described.

65,716.—GRAIN SEPARATOR.—A. J. Alexander, Chicago, Ill.

I claim winding the cylinder, C, with wire in spiral form, leaving the intervals between the threads of wire somewhat less than the transverse diameter of the grade of grain to be passed through said cylinder, substantially as and for the purpose herein specified.

65,717.—BUTT HINGE.—Mason C. Ames, Hartford, Conn.

I claim the arrangement of the hinge joint, b, in its relative position with the plates, a' a, substantially as and for the purpose described.

65,718.—PUMP.—Charles Bemis, Mishawaka, Ind.

I claim the arrangement herein set forth of the cylinders, B B', with their piston heads and rods, the pipes, D and H, with their valves, and the slotted lever, E, with its crank, all constructed and used with the boxes, A A2, as and for the purpose herein specified.

65,719.—CULTIVATOR.—Joseph C. Bird, Rising Sun, Md.

First, I claim the arrangement of the share frame, E, supported from the lever, H H', and pivoted frame, I p, in such a manner as to lift vertically or independently, as described.

Second, The trapezoid-shaped cultivator frame, consisting of the portions, a a a b b c c, arranged substantially as described.

Third, The share, e, formed double without a weld, pinched in at the center to embrace the standard, F, and with flaring ends, in combination with the stirrup brace, substantially as represented in Fig. 4.

65,720.—HYDRAULIC WEIGHING APPARATUS.—Louis Braner, Memphis, Tenn.

First, I claim a wheel which is provided with buckets or chambers upon its circumference, and also with a continuously acting counterbalance, and which is adapted for weighing, substantially as described.

Second, The combination of a registering or recording mechanism, with a continuously rotating weighing apparatus, operating substantially as described.

Third, Sustaining a rotary weighing wheel, which is provided with a continuously acting counterbalance upon anti-friction rollers at both ends of its axle, and connecting such wheel directly to the registering mechanism, substantially as described.

Fourth, The case, I, adapted for receiving the registering mechanism when it extends from the face plate of the wheel case, A, into the space surrounding the center of the weighing wheel, all constructed and arranged substantially as described.

Fifth, The trap, K, and overflow, l, substantially as described and shown, for conducting the fluid to be weighed upon the weighing wheel and into the buckets thereof, substantially as described.

Sixth, The arrangement of the receiving chamber below the wheel case, A, substantially as and for the purpose described.

Seventh, The sample chamber, F, with the outlet, F', and a valve, t, substantially as and for the purposes described.

Eighth, The hydrometer receiver or receivers, for the purpose specified.

65,721.—SLIDE FOR SAFETY REINS.—Frank W. Brooks, Washington, D. C.

First, I claim a metallic slide, which is adapted for being attached to the safety lines, A, of the reins, B, and which is provided with a ring or loop, c, substantially as and for the purposes described.

Second, The construction of an arresting hook upon the sliding portion, a, substantially as described.

65,722.—MATCH SAFE.—Charles Bunger, New Haven, Conn.

I claim the match safe constructed substantially as herein described, provided with an inclined bottom, B, and the trough, D, into which an opening through the front permits a single match to enter the said trough, and constructed so as to remove the match from the said trough, substantially as and for the purpose specified.

65,723.—BLANK FOR CALKS OF HORSE SHOES.—R. B. Caswell, Palmer, Mass.

I claim, as a new article of manufacture, bars of steel formed for toe calks, substantially in the manner herein described.

65,724.—STUMP EXTRACTOR.—George Chamberlin, Olean, N. Y.

First, I claim the metal cap flange or head, as constructed, having a concave socket, into which is fitted a concave washer to reduce the friction and allow changing the position of the line of draft on the screw, in the manner and for the purposes herein described.

Second, I claim the flange cap, C, and socket concave washer, E, in combination with the rotating screw box or nut, F, and lever sweep, K, substantially as and for the purposes set forth.

Third, I claim the construction of the cast-iron double-headed screw, with its wrought-iron central supporting rod to give strength and durability, as described.

Fourth, I claim the screw rod, H, hand wheel, k, and double-hooked

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swivel, j j, in combination with the main screw, D, for taking up the slack in hitching, as specified.

Fifth, I claim supporting the lever sweep, G, on the rim of the flange cap, C, so that it will operate substantially as and for the purposes herein set forth.

65,725.—CORN PLOW.—John M. Clark, Somerville, Ohio.

First, I claim the adjustable cross braces, B B, connected with the rear end of the beam, D, in combination with the standards, A A, constructed, arranged, and operating conjointly in the manner and for the purpose specified.

Second, The combination of the ratchet and latch represented in Fig. 5, with the adjustable link, j, and draw bars, i i, arranged in the manner and for the purpose described.

Third, The guard o, and detent m, in combination with the tongue k, bars a', and wooden pin, n, arranged and operating substantially as and for the purpose described.

Fourth, The construction of the plows of a single sheet of metal in the manner represented in Fig. 3, for the purpose described.

65,726.—COMBINED LEVEL AND PLUMB.—Patrick Clifford, Holyoke, Mass.

I claim the spindle, D, passing through the stock, M, having secured to it at one end the case A, its other end bearing the index I, on its conical part, and tightening nut, S, all constructed and arranged substantially as herein described and set forth.

65,727.—CANT HOOK.—William S. Colburn, Loami, Ill.

I claim the cant hook consisting of the forked slide, D, bolt, C, hook, B, and lever, A, constructed and operating in the manner herein described.

65,728.—HORSE SHOE.—George W. Cooper (assignor to himself and James V. Jones), Ogeechee, Ga.

First, I claim a plow or horse hoe of four separate sections, viz.: base A, center plate B, and shares C C, constructed and arranged substantially as described and for the purpose specified.

Second, I claim the shoulders a a, formed in the opposite sides of the plate, B, substantially as described and for the purpose specified.

Third, I claim the metallic sole D, secured to the base plate A, for regulating the depth of the furrow, substantially as described.

65,729.—LENS FOR PHOTOGRAPHIC PORTRAITURE.—J. H. Dallmeyer, London, England.

I claim the construction of lenses or objectives suitable for photographic purposes, the component parts of which are of such form and so positioned that by a slight variation of distance between the lenses of one of the combinations, as by means of a screw movement, the operator can produce at will any desired amount of spherical aberrations or diffusion of focus, without at the same time materially deranging the other necessary corrections of photographic lens, substantially as herein described.

I also claim the combining lenses, a a' b b', substantially as herein described.

65,730.—ARTICLES OF PAPER WEARING APPAREL.—George W. Day, Charlestown, Mass.

I claim, as an article of manufacture, paper either plain or enameled, embossed or imprinted by means of a woven fabric applied to its surface under pressure, either before or after its conversion into articles of wearing, applied substantially as set forth.

65,731.—BED BOTTOM.—George H. Dow, Freeport, Ill.

I claim the arrangement of the sectional rubber springs, G H, between the single slats, E I and J, forming a vertical series held together by the straps K, constituting the bed bottom, in the manner described.

65,732.—HARVESTER.—Matthew Easterbrook, Jr., Geneva, N. Y.

I claim the arrangement of the two loose pinions f and g, on the crank shaft, C, in combination with the bevel, having two sets of teeth b and d, when the said pinions are locked to the shaft by a clutch or clutches, substantially as herein shown and described and for the purposes set forth.

65,733.—PROCESS OF MANUFACTURING ILLUMINATING GAS.—William Elmer, New York City.

First, I claim the construction of a tube attached to the mouth piece of each retort, and terminating in a gas-tight rotary supply valve, through which coal or other material for generating inflammable gases is introduced out of contact with the atmosphere into the retorts, and moved forward by means of a receiver and slide situated within the mouth piece, substantially as set forth, and this I claim whether accomplished by a rotary valve or otherwise.

Second, I also claim the construction of an outlet tube from the further or back end of each retort, the end of which tube is sealed by dipping into a reservoir of coal tar or other suitable substance, so as to exclude the air from entering the retorts and to prevent the escape of the gases generated in the retorts, by which the coke is discharged without opening the retorts, substantially as above set forth.

Third, I claim the method of subjecting the gas material within the retorts in a gradual manner to the heat, and as the process advances and the volatile products are given off, the gas material is moved forward until brought in contact with the highest heat where it is converted into gases, substantially as above set forth; and this I claim whether the coal or other material employed in gas making is conveyed into the retorts in the precise manner described by me or otherwise.

Fourth, I further claim the application of a current of electricity introduced into the retorts for the purpose of decomposing the aqueous vapor formed in the process of gas making, and also for the purpose of inducing the chemical affinities of certain elementary bodies present, by which a gaseous compound is formed, as above described.

Fifth, I further claim the combination of the gas-making retort with an electric battery, excited either by heat or by chemical solutions, substantially as above described.

65,734.—LUBRICATOR.—Joseph Fanyou, Bridgeport, Conn.

I claim the combination, as described, of the cup and the transverse bar with the screwed spindle and regulating nut.

65,735.—CLOTHES DRYER AND STAND COMBINED.—George Farmger, Pittsford, Mich.

I claim the cover D, provided with its hooks E E, for holding the frame as constructed in the desired position, and forming a stand for the clothes when combined and used for the purposes specified.

65,736.—COAL SIFTER.—John S. Fifield, Westerly, R. I.

I claim the arangement of the box A, with wheel E, as constructed, sieve H, spout D, and drawer C, in the manner and for the purposes substantially as set forth.

65,737.—MOP WRINGER.—W. W. Finch, Mishawaka, Ind.

I claim the forked bar E, upon the end of the rod, D, used in combination with the frame, A, contracted at the end in the manner and for the purposes specified.

65,738.—SORGHUM EVAPORATOR.—Addison L. Folger, Sumner, Ind.

First, I claim the combination of the furnace A, having a longitudinal partition, A3, the transverse overhung pans E E1 E2, and longitudinal pans, M and N, substantially as described.

Second, The furnace, A, constructed with double flues, A1 and A2, which are independently regulated by means of the dampers, C and D, arranged to operate in relation to the pans, M and N, substantially as described.

Third, The arrangement of the pans, E E1 E2, gates, F, screen, G, lever, I rod, K, nut, K', and springs, L, substantially as described.

Fourth, The arrangement of the transverse and longitudinal pan with flanges, H H, intermediate plate, H', and gates, F, and screens, G, substantially as set forth.

65,739.—PARLOR TEN-PIN ALLEY.—Charles H. Fowler, West Roxbury, Mass.

I claim the application and arrangement of the trap floor, f, in such manner that it shall be lowered simultaneously with the act of raising the pins, and returned to place when such act has been accomplished, essentially in manner and for the purpose as set forth.

I also claim the mechanism for operating the pins and trap floor, consisting of the cords, n n n, etc., block and wedge, v and c, ropes, w g a' and b', pulley, l, and spring, d', combining and operating together to produce the effects substantially as before described.

65,740.—STEERING INDICATOR.—Nicolai C. Franzen, Hamburg, Germany.

First, I claim the combination with the rudder of steering gear of vessels of a dial plate and index, or their equivalents, so connected with the steering apparatus that any movement of the rudder will be indicated on such dial when such dial and index or indicator are so placed in respect to the deck of the vessel as to be plainly visible from different parts of the vessel, for the purposes set forth.

Second, The combination and arrangement in such an indicator, when so located, with the steering gear of a vessel, of an index moving over a dial, such index and dial being of strong contrasting colors to indicate by day the position and movement of the rudder, substantially as and for the purposes set forth.

Third, The combination and arrangement in such an indicator, so located and connected with the steering gear, of plates of differently colored glass or other transparent material, with a movable opaque plate or surface, having a suitable aperture cut therein, and with a light or lamp, arranged and combined substantially as described to indicate at night, by differently colored lights, the position and movements of the rudder for the purposes set forth.

Fourth, The combination in one and the same indicator of an index moving over a differently colored surface, or their equivalents, and of colored transparent plates in connection with a movable opaque, perforated plate and with any light, the several parts arranged and operating severally and in combination substantially as described, thereby rendering the same instrument either a day or night indicator of the movements of the rudder, for the purposes set forth.

65,741.—METAL BARREL.—John A. Frey, New York City.

First, I claim strengthening and protecting metallic barrels, by making their hoops of wood, substantially in the manner and for the purpose described.

Second, The mode herein set forth of placing the end hoops to secure the chimes from indentations, and also the mode of securing the end hoops in place by swaging out the chimes, substantially in the manner and for the purpose set forth.

65,742.—MAGAZINE REVOLVING FIRE-ARM.—Edward J. Frost, New York City.

First, I claim the pawl, K, in combination with the magazine spring, e, as and for the purpose set forth.

Second, The plunger, h, spiral spring, h', and thumb catch, h2, arranged for engaging with the hammer, substantially as explained.

65,743.—METHOD OF UNLOADING RAILROAD CARS.—Ferdinand Haase and William Rost, Oak Park, Ill.

First, We claim the folding atform, A, constructed and operating substantially as set forth.

Second, The pulley, E F F, rod, g', and chains, G G, in combination with plates, H H, lever, I I, cog-wheels, K K, and the drum, O, of the brake, the whole arranged so as to bring down the cog-wheels, K K, when desirable, and mesh their teeth into the teeth of the pinions, R R, of the car-axle, substantially as herein described and specified.

Third, The pinions, R R, set on the car-axles, in combination with the described device to automically unload the folding platform, A, substantially as set forth.

Fourth, The device to gradually fold the platform, A, consisting of brackets, l l and m n, rods, v v, ratchet wheel, p, and lever, q, constructed as described, the whole arranged and operating substantially as herein described and for the purpose specified.

Fifth, The plates, T T, hinged to the car frame to raise the platform, B B, in combination with the said platform, substantially as described and specified.

65,744.—SCALE RULE.—William Hay, Dumbarton, Scotland, assignor to Robert Hay, Mineral Point, Wis.

First, I claim providing a rule with a fixed scale, b b, indicating the circumference of circles arranged in relation with the ordinary measuring scale, a a, substantially as herein set forth for the purpose specified.

Second, Providing a rule with a chord scale, a c, arranged in combination with the radius scales, d d, substantially as herein set forth for the purpose specified.

Third, Providing a rule with the scale, e e, arranged in relation with the radius scales, d d, substantially as herein set forth for the purpose specified.

Fourth, The construction of a rule with the scales, b b c c d d and e e, arranged in relation with each other and with the scale of inches or other measurement, substantially as herein set forth for the purpose specified.

65,745.—DEVICE FOR SHEARING METALS.—John E. Heath, Niles, Mich.

I claim the racks, E G P, and pinions, F H, provided with the handles, N N, constructed and combined substantially as set forth.

The set screw, O, in combination with the arms, A B, provided with racks, E G P, and pinions, for the purpose of limiting the movement of the arms away from each other and the movement of the operative lever.

The slotted cutters, J J, in combination with the screw, L L, set screw, M M, and jaws, A B, substantially as and for the purpose set forth.

65,746.—GRAIN BINDER.—Solomon T. Holly, Rockford, Ill.

First, I claim the arrangement in binding apparatus of the band-securing instrument and compressing strap-holder at opposite sides of the ring-carrier, substantially as set forth.

Second, I also claim the combination in binding apparatus of the jaws of the cord-holder with a shear blade, substantially as set forth.

Third, I also claim a cord-twister for binding apparatus, composed of an arbor and jaws, one of which is movable toward and from the other in the direction of the length of the arbor, substantially as set forth.

Fourth, I also claim the combination in binding apparatus of the following instrumentalities, viz.: the ring-carrier, driving shaft thereof, band-securing instrument and connecting and disconnecting mechanism, all operating in the combination, substantially as set forth.

Fifth, I also claim the combination in binding apparatus of the following instrumentalities, viz.: the band-securing instrument, ring-carrier, gearing ring and connecting and disconnecting mechanism, all operating in the combination substantially as set forth.

Sixth, I also claim the combination in binding apparatus of the following instrumentalities, viz.: the band-securing instrument and gearing-ring, the latter operating the former substantially as set forth.

Seventh, I also claim the combination in binding apparatus of the following instrumentalities, viz.: a detachable strap-holder, detent therefor, gearing-ring and ring-carrier, all operating in the combination substantially as set forth.

Eighth, I also claim the combination in binding apparatus of the following instrumentalities, viz.: a detachable strap-holder, detent therefor, ring-carrier, and driving shaft therefor, all operating in the combination substantially as set forth.

Ninth, I also claim the combination in binding apparatus of the following instrumentalities, viz.: the appurtenance of the band-securing instrument, gearing-ring and ring-carrier, all operating in the combination substantially as set forth.

Tenth, I also claim the combination in binding apparatus of the following instrumentalities, viz.: the appurtenance of the band-securing instrument, ring-carrier and driving shaft thereof, all operating in the combination substantially as set forth.

Eleventh, I also claim the combination in binding apparatus of the following instrumentalities, viz.: the latch of the connecting mechanism of the ring-carrier and band-securing instrument, the former operating upon the latter substantially as set forth.

Twelfth, I also claim the combination in the binding apparatus of the following instrumentalities, viz.: the gearing-ring, the detent of a detachable strap-holder, the detachable strap-holder, ring-carrier and connecting and disconnecting mechanism, all operating in the combination substantially as set forth.

Thirteenth, I also claim the combination of a stop mechanism of a ring-carrier and the cord-holder of binding apparatus in such manner that the first instrumentality operates the second substantially as set forth.

Fourteenth, I also claim the combination of the stop mechanism of a ring-carrier and the shear-blade of a binding apparatus, substantially as set forth.

Fifteenth, I also claim the combination of the stop-latches of the ring-carrier of a binding apparatus with a stop formed of parts, one of which is movable, the whole operating substantially as set forth.

Sixteenth, I also claim the combination of the movable jaw of the band-securing instrument of a binding apparatus with a hand lever, so that it may be readily opened, substantially as set forth.

Seventhenth, I also claim the guide for the binding material, consisting substantially of a V-formed instrument and gate, substantially as set forth.

Eighteenth, I also claim the combination in binding apparatus of the tongue that retains the binding material in the track of the movable instrument that is to seize it, with the driving shaft of the apparatus, through the intervention of a cam, substantially as set forth.

Nineteenth, I also claim the combination of the tongue that retains the binding material with the cord-carrier, in such manner that the former may be moved laterally to the track of the binding material to remove it from its path at one period and to insert it in its path at another in the operation of binding, substantially as set forth.

65,747.—STEM WINDING WATCH.—Edwin B. Horn, Boston, Mass.

First, I claim the ring gear D, when arranged in combination with the face of a watch, substantially as described and for the purpose set forth.

Second, I claim the auxiliary stem L L, passing through the centre of the winding stem A, substantially as described and for the purpose set forth.

Third, I claim the combination as well as the arrangement of the auxiliary stem L, with the gear wheel KK, and the lever M M, substantially as described and for the purpose set forth.

65,748.—CALENDAR CLOCK.—Henry B. Horton and M. L. Wood, (assignors to the Ithaca Calendar Clock Company), Ithaca, N. Y.

First, We claim the interposition of the connecting devices made as described, between any convenient part of the time movement and of the calendar, and all equivalent therefor, when so constructed that the calendar can be tested or proven, with or without motion, of the time movement or any portion thereof, the said devices being applied to any part or point of the time movement or connected therewith, for the purpose of testing by machinery the calendar, when substantially made as and accomplishing what has been described.

Second, We claim a changeable or self-adjusting fixture on or connected with the shaft of the twenty-four hour wheel, as specifically shown by the use of the wedge G, pin H through the tube, E, and shaft, F, and also at I, as set forth.

Third, We claim broadly the employment of the mechanism described or any equivalent thereunto, by which one or more calendars are tested or proven, after the clock and calendar, or clocks and calendars are completed, and further we claim broadly the machinery by which one or more calendars are tested or proven, whether the calendar or calendars are connected with the time movement or not.

Fourth, We claim specifically the employment of the crank or cranks, O, or other conveniently made equivalent with the rod or rods, D, or other equivalent, by which the time calendar cams, A, of separate clocks are moved, for the purpose of testing or proving them by machinery, as described.

Fifth, We claim broadly arranging and making a suitable machine or mechanism, for the purpose of applying to and removing from the same in any convenient manner, one or more calendar clocks, either in a finished or in any partially completed state for the purpose of trial test, or proving of the calendar or any of its parts or of any part or portion of the time movement necessary to the connection of the time movement and calendar, when substantially accomplishing the end or object we desire or have described.

Sixth, We claim so arranging a series of calendar clocks, and also of calendars only, in connection with air test line or mechanism, that the changes of months, days of the month and days of the week or other appropriate changes of calendar clocks, are made simultaneously or nearly so, through the whole line or series, for the purpose of mutually proving or testing each other, thus making apparent any defect of construction or operation in any one or more of them, as described.

Seventh, The claim testing calendar clocks, by applying to or actuating their movements by a propelling or driving mechanism, in such a way that these movements may be accelerated to the extent and purpose set forth in this specification, using therefor such propelling machinery as is herein set forth, or any equivalent therefor, and the interposition of the connecting devices set forth, or any equivalent therefor.

65,749.—BUCKLE.—G. C. Huntress, Elkhorn, Wis.

I claim a buckle consisting of the frame, D, having the cross-bar, F, and tongue, A, formed thereon, and having the lever, C, with the tongue, B, attached, pivoted to the frame as herein described.

65,750.—TEETH FOR LIFTING LODGED GRAIN.—William Marcus Jackson, Woodland, Cal.

I claim the elastic shoes in combination with the yielding fingers applied to a section or frame to be attached to a reaper, and all arranged to operate in the manner substantially as and for the purpose set forth.

65,751.—SYRUP STRAINER.—W. E. Jacobs, Columbus, Ohio.

I claim a straining apparatus, which consists of a box, A, having a division B, and strainer, C, applied within it, in such manner that the liquid to be strained shall pass upward through the strainer, substantially as described.

65,752.—PRESSES.—Gilbert D. Jones, New York.

First, I claim in combination with the follower of a press, three toggles, arranged relatively to each other and pivoted to the follower in the relation to each other substantially as set forth, the combination being substantially as described and operating substantially as set forth.

Second, In combination with three toggles, I claim cogged sectors attached and gearing together, substantially as described, whereby the three toggles may be made to move in unison as set forth.

Third, In combination with three toggles and their cogged sectors, I claim a sector in gear with a screw, the combination substantially as described and operating substantially as set forth.

Fourth, In combination with two sets of toggles to operate followers in opposite directions, I claim right and left hand screws mounted upon the same shaft, the combination being and acting substantially as set forth.

65,753.—ENGINE PISTON.—Washington Keemle, Philadelphia, Pa.

First, I claim the combination and arrangement of the central tube, C, with the packing, by means of the crown wheel, G, pinions, F F' F', and nuts E E' E', substantially in the manner described and for the purpose specified,

Second, The combination of the pinion, P, with the follower-ring, H, and with the wheel, L, by means of the pinion, M, and pawl, O, substantially as described and for the purpose set forth.

Third, Constructing the screw thread of the rod, D, of coarser pitch than those of the rod, D D, substantially as described and for the purpose specified.

65,754.—INDIA RUBBER TREAD FOR CARRIAGE STEPS.—Geo. Augustus Keene, Newburyport, Mass.

I claim the arrangement and combination of the plate, f, in connection with and securely fastened to the rubber tread, consisting of reticulated ridges, b and c, and intaglio cells, a and d, to form a tread for a carriage step substantially as described,

65,755.—CORN PLANTER.—Geo. W. Knapp, Corning, N. Y.

First, I claim the adjustable revolving arms, D D, constructed and operating as described and for the purposes set forth,

Second, The revolving wheel K and feed buckets, c c c c, constructed and operating as described, and for the purposes set forth,

Third, The automatic valves, P P, as described, and for the purposes set forth.

Fourth, The automatic scrapers, q q, constructed and operating as described and for the purposes set forth,

Fifth, The treadle levers, 2 and 3, with levers, 2 2, for elevating the arms D D D, &c, the furrowers L L, the valves, P P, and scrapers q q, constructed and operating as described and for the purposes set forth.

Sixth, The combination of the arms, D D, &c., with the feed wheel, k, revolving feed buckets, c c c, &c., and the valves, P P, the whole constructed and operating as described and for the purposes set forth.

Seventh, The furrows, L L, and the manner, herein described, of attaching and detaching the furrowers, holding them firmly, or allowing them to revolve by means of the devices herein described and set forth.

65,756.—SLED BRAKE.—Herman E. Knapp, Benson, Vt.

I claim the levers, d d, in combination with the rods, f f e e, lever, A, rod, G, and lever, C, all acting in combination with the double claw arms, B, or their equivalents, the whole combined as specified and for the purpose set forth.

65,757.—LIFTER FOR THE LIDS OF PITCHERS.—F. W. L. Knuschke (assignor to the Gorham Manufacturing Co.), Providence, R. I.

I claim the lifter or lever, in combination with the handle and hinged lid of a pitcher or other vessel, substantially as described for the purpose specified.

65,758.—HOSE COUPLING.—Silas H. Lornig, Lawrence, Mass.

I claim the ring, C, within the end of the hose, D, in combination with the annular clamping ring, E, and flange socket, B, the flange, A, or projecting end, b, all arranged substantially as and for the purpose set forth.

65,759.—FERRULE FOR TUBULAR BOILERS.—David Matthew, Prairie du Chein, Wis.

First, I claim the projecting ferrules, B, constructed and arrangad as and for the purpose herein set forth.

Second, I claim the ring, D, combined with the projecting ferrules in front of the flue sheet to protect it, as set forth.

65,760.—DIVING APPARATUS.—Thomas Cato McKeen, Irvington, N. J., assignor to the New York Submarine Co.

I claim the use and application of hoops or rings to the diving dress, constructed and operating in the manner and for the purposes described.

65,761.—JOINT FOR CARRIAGE BRACES.—F. B. Morse, New Haven, Ct. Antedated May 21, 1867.

I claim the cone, D, formed upon an inverted conical ear, C, on the one part, combined with a corresponding ear, E, provided with an internal conical seat upon the other part to correspond to the cone, D, the whole constructed substantially as herein set forth.

65,762.—METHOD OF MANUFACTURING SHACKLES FOR CARRIAGE THILLS.—F. B. Morse, New Haven, Ct.

I claim the method, herein described, of forming the square-backed shackle blank, described and represented by fig. 8.

65,763.—WATER ELEVATOR.—Gresham Molt, Big Run, Ohio.

I claim the arrangement of the chain, D, provided on its inside with buckets, E, with the wheel, B, having arms, C C, and trough, F, substantially as and for the purpose herein set forth.

65,764.—TOY TORPEDO AND EXPLOSIVE COMPOUND.—Chas. Nelson (assignor to himself and Louis Klueber), New York City.

First, I claim the toy torpedo, herein described, having a body molded in the form required, and composed of materials in the proportions, which shall be harmless in exploding, substantially as herein specified.

Second, I claim, as an explosive composition for torpedoes and analogous uses, the compound herein described, composed of materials in the proportions, substantially as herein specified.

65,765.—WINNOWING SCREEN.—H. Ogborn, Richmond, Ind.

First, I claim the apparatus for giving an upward direction to the fan-blast, consisting of the pivoted guide plates, F', provided with rods, G, in combination with the notched plates, F, substantially as described and for the purposes specified.

Second, The guide plates, F', and notched plates, F, in combination with the screens, L and H, substantially as and for the purposes set forth.

Third, The L-shaped lever, R, rods, I and S, pinion, C, on the fan shaft and gear wheel, B, in combination with the screens, L and H, arranged substantially as described.

Fourth, In combination with the above, the adjustable slide, o, and pivoted lever, T, substantially as and for the purposes set forth.

65,766.—METHOD OF ATTACHING METAL SOLES TO BOOTS AND SHOES.—Homer Riggs, Washington, D. C.

I claim securing taps or oversoles of sheet metal or other suitable material to the bottom of boots and shoes by making slotted holes, d d, in the ears, a a and also in the rear end of the tap, A, to be sprung over the screw heads, e e, so that the taps may be removed and replaced by the wearer at pleasure substantially as and for the purposes hereinset forth.

65,767.—APPARATUS FOR DRYING HIDES, LEATHER, ETC.—A. W. Roberts (assignor to P. Jewell & Sons), Hartford, Ct.

I claim driving the air through heating tubes, A, arranged in a heating chamber, B, into a drying apartment, G, substantially as and for the purpose described.

65,768.—EMBROIDERING ATTACHMENT FOR SEWING MACHINES.—Israel M. Rose (assignor to the Sewing Machine Improvement Co.), New York City.

I claim, First, The combination of the frame, B, spring, C, and point, d, with the vibrating arm or lever, D, constructed and arranged substantially as above set forth for laying the embroidery thread or twist in proper position as described.

Second, I claim a spring, C, having a spring point, d, as shown in combination with the vibrating arm, D, substantially as and for the purpose set forth.

65,769.—WINDING AND SETTING WATCHES.—Henry Rothfelder, New York City.

I claim the pawl carrier, r, located between the usual ratchet wheel on the arbor of the spring barrel and the ratchet wheel, t, and receiving motion from the wheel, m, pinion, l, and burr, d, for winding the watch as set forth.

I also claim the setting wheel, u, provided with long teeth and set upon the levers, v, in the manner specified, in combination with the wheel, m, pinion, z, and connection to the burr, d, as and for the purpose set forth.

65,770.—STOVE PIPE DRUM.—Charles E. Rapell, Jacksonville, Ill.

I claim arrangement of the annular radiator, A, and pipe, B, provided with its tubes, D E, and conical pipe, C, in the manner substantially as and for the purposes set forth.

65,771.—CORN PLANTER.—James P. Lelsor, Cherry Box, Mo.

I claim the employment of the ratchet, D, substantially in the manner herein described and set forth.

I also claim the combination and arrangement of the wheel, A', and the ratchet, D, the lever, C C1, and the spring, C2.

65,772.—BRICK KILN.—William A. Shephard, New York City.

First, I claim an oblong building with a railroad track running through its whole length and divided into separate compartments by means of removable partitions in combination with a series of cars having fire brick or their equivalent platforms and adapted to building kilns thereon, and burning the same on the cars, substantially as described.

Second, I also claim building and burning kilns of brick, pottery or other similar substances on movable railroad cars with platforms of fire brick or equivalent material, substantially as described.

65,773.—DOOR AND BIT FOR BOILING AND PUDDLING FURNACES.—William Sims, Pittsburgh, Pa.

I claim an improved door and a new bit to be fastened thereon for puddling or boiling furnaces or all other furnaces, subject to intense heat.

65,774.—PRIMING METALLIC CARTRIDGES.—Dexter Smith, Springfield, Mass.

I claim a center fire cartridge in which the anvil is attached to the interior of the head of the cartridge shell by means of the flange, a, formed on the inside surface of the same, substantially as described.

65,775.—LIGHTNING RODS.—Charles Stearns, Lowell, Mass. assignor to Jacob A. Kissell, Chicago, Ill., who assigns one-half of his right to Nathan Blickensderfer, Erie county, Pa.

I claim a lightning rod or conductor consisting of a solidly continuous strip of sheet metal, substantially as described.

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65,776.—FASTENING FOR NECK TIES.—William J. Terry, Walla Walla, Washington Territory.

First, I claim the stud or fastener provided with the removable head constructed and applied substantially as and for the purpose set forth.

Second, The slotted shank in combination with the removable head, substantially as and for the purpose described.

Third, The head, c, and flanges or disks, b b', provided with points for the purpose of preventing the turning of the fastener as described.

Fourth, The neck tie provided with the eyelet hole, f, whereby it is adapted to be used in connection with the fastener, substantially as described.

65,777.—PRESERVING FLOWERS AND OTHER VEGETABLE FORMS.—Mrs. P. T. Pinnig, New York City.

I claim the employment of a solution of glass, or other liquid silica, substantially as and for the purposes set forth.

I also claim in combinatton with the above the pulverized glass or silica, all as herein specified.

I also claim inclosing the objects as herein set forth in a vacuum, when they have been thus prepared.

I also claim filling the receiver, in which objects prepared as above set forth are placed with an atmosphere of carbonic acid gas.

I also claim the receiver for containing the carbonic acid gas as herein described, having an elastic or yielding portion, to allow of the expansion of said gas without undue pressure in the chamber of said receiver.

65,778.—HORSE RAKE.—Stephen W. Walker, Anson, Me.

I claim the combination of the frame, e, rods, f, springs, i, and teeth, a, arranged and operating substantially as described.

65,779.—METHOD OF ATTACHING EAVE TROUGHS TO HOUSES.—Wm. R. Wallis, Alliance, Ohio.

I claim the strap, D, when used in combination with the strap, C, and plate, E, with its thumb screw, F, as and for the purpose herein set forth.

65,780.—APPARATUS FOR HARDENING AND TEMPERING WIRE.—James C. Walter, New York City.

First, I claim the combination of the screw, C, with the sliding head, B, and frame, A, substantially as herein set forth for the purpose specified,

Second, The combination of the tension spring, the sliding head and the frame, A, substantially as herein set forth for the purpose specified.

Third, The sliding head constructed with clamping blocks, d, and tightening screws, f, substantially as herein set forth for the purpose specified.

Fourth, The arrangement of the screw, C, tension spring, D, sliding head, B, and frame, A, substantially as herein set forth for the purpose specified.

65,781.—WEATHER STRIP.—Jeremy B. Wardwell, Georgetown, D. C.

I claim the weather strip provided with the spring by which the elastic strip, F, is made to conform to the irregularities of the threshold, as herein described for the purpose specified.

65,782.—MACHINE FOR DRESSING FEATHERS.—A. Washburn and J. N. Van Sickle, Medina, Ohio.

We claim the arrangement of the pipes, C D E M, faucets, G, and perforated pipes, H, substantially as described.

We also claim the arrangement shown in fig. 3, whereby during the rotation of the machine the water of condensation is led into a single pipe, from which it is discharge by faucet, L, substantially as described.

65,783.—BREECH-LOADING FIRE-ARM.—Thomas W. Webley, Birmingham, Eng.

I claim applying a spring to the locking bolt of what is known as the Lefancheux or double-grip action catch of breech-loading fire-arms, so as to cause the gun to be self-locking when closed by forming the barrels home.

65,784.—AIR-HEATING FURNACE.—Geo. W. Wilson, Chelsea, Mass.

I claim the arrangement as well as the combination of the main radiator. E, the fireplace, A, the hollow abutments and the air space between the fireplace and main radiator.

I also claim the combination as well as the arrangement of the auxiliary radiator, G, the main radiator, the fire plate, the air space, F, and the abutments, D D, for supporting the main radiator and conducting smoke into it from the fireplaces.

I also claim the combination as well as the arrangement of the U radiators and the bent pipes, L L, with the fireplace or chamber of combustion, and either or both the radiators arranged as specified.

I also claim the application of the grate to the fireplace by means of the pendulous plates applied to the journals of such grate and to the fireplace, substantially as set forth.

I also claim the combination and arrangement of the scraper, P, and its rod, Q, with the main arched radiator and the front plate, H, as explained.

I also claim the arrangement of air registers with respect to the fireplace, the escape passages thereof, and the front plate, H, the whole being substantially as hereinbefore specified,

RE-ISSUES.

2,641.—RAKES FOR REAPING MACHINE, Adam R. Reese, (assignee of Thomas N. Lupton), Phillipsburg, N. J. Patented Sept. 25, 1865.

First, I claim arranging the automatic rake so as to pursue a path parallel or nearly so to the side of the platform next to the standing grain, thence across the platform parallel or nearly so to the front, and thence towards the rear of the platform, and then returning to the place of beginning continuously.

Second, An automatic rake in combination with an elongating arm or shaft, for carrying or driving it.

Third, An automatic continuously rotating rake on a vertical axis mounted on the platform in combination with a straight finger beam.

Fourth, Attaching the rake head to an extensible arm in such manner as to allow the rake head to follow the contour of the platform in its rotation.

2,642.—CRUCIBLES FOR METALLIC BATHS.—Benjamin S. Stokes, Manchester, N. H. Patented July 25, 1865.

I claim a crucible, having its outer surface protected in whole or in part by a metal jacket or covering, or the equivalent thereof, substantially as set forth.

Also, combining with an inner and an outer crucible, a space or chamber between them, filled with sand or equivalent material, substantially as described.

2,643.—HARVESTER.—Wm. N. Whiteley, (assignee of John S. Troxel), Springfield, Ohio. Patented May 11, 1858. Division A.

First, I claim mounting and operating an overhanging reel for a harvester upon a vibrating yoke or frame pivoted at the the axis of the shaft which drives or communicates motion to the reel, so that the reel may be moved backward or forward, as desired, without materially affecting the length of the band or other driving mechanism, substantially for the purposes set forth.

Second, Pivoting the reel yoke or support at the axis of the shaft, which drives the reel, in combination with the slot, H, or its equivalent, and a clamping device to render the adjustment back and forth quick and easy, and to retain the reel at any point desired, substantially for the purpose set forth.

2,644.—CASTER.—James T. Barnes, Hudson City, N. J. Patented Oct. 30, 1866.

First, I claim the caster constructed as described, having the shank, A, cast directly upon the central portion, B, of the axle between the two wheels as herein set forth for the purpose specified.

Second, The arrangement of the wheels, aa, in combination with the shoulder shank, A, arm, B, with its axle, d d, and the washers, c, and bolt, b. substantially as and for the purpose herein shown and described.

Third, The shank, A, enlarged upon two of its sides, to form a shoulder, f, fitting and turning loosely from the rib, h, upon the inside of the mouth of the socket, C, said socket being sprung open to receive the shank as herein set forth for the purpose specified.

2,645.—VALVE MOTION FOR STEAM ENGINES.—John D. Shepard, Buffalo, N. Y., assignee of Horatio O. Perry. Patented March 25, 1856. Division A.

I claim the valve motion above described as arranged in relation to and in connection with the loosely attached, hollow throated and partially rotating valve, substantially as described and for the purposes herein set forth.

2,646.—VALVE FOR STEAM ENGINES.—John D. Shepard, Buffalo, N. Y., assignee of Horatio O. Perry. Patented March 25, 1856. Division B.

I claim holding the axis of the hollow throated partially cylindrical valve, V T, coincident with the center of the curve of the cylinder face by oscillating it by acting on the duplicate bearings, V1 V2 S1 S2, so that it is at liberty to approach and recede from the cylinder face, substantially as and for the purpose herein specified.

2,647.—MOWING MACHINE.—Peter V. Staats, Raritan, N. J., assignee by mesne assignments of John G. Dunham. Patented Dec. 18, 1860. Division A.

First, I claim the combination, in a moving machine, of a stationary metallic axle with the portion between the bearings of the wheels bent and a crank-shaft, arranged transversely thereto, with the driving gear, arranged on one side of the axle, and the crank and pitman on the other.

Second, The combination, in a hinge-joint mowing machine, of two driving wheels, a main frame located between the wheels, and extending both in front and rear of the main axle with a hinged or limber tongue in front, by which to draw the machine, and a caster wheel to support the back end of the frame.

Third, Connecting a short laterally-projecting finger beam to the inner side of the main frame by a coupling arm in the same vertical plane as the finger beam, and having two parallel joints, transverse to the beam, whereby a short coupling arm can be used, and yet either end of the cutting apparatus be free to rise or fall independent of the other.

Fourth, The combination, in a mowing machine, of two main carrying wheels, a main frame located between the wheels, and a laterally projecting hinged finger beam having two parallel joints in the coupling arm with a brace for drag bar, for the purpose of resisting the backward strain of the finger beam, supported at the upper end by means of the main frame in front of the inside carrying wheel.

Fifth, The combination with a short laterally projecting flexible finger beam having two parallel joints in the coupling arm at right angles to the beam of a supporting wheel attached directly to each end of and in rear of the finger beam.

2,648.—MOWING MACHINE.—Peter V. Staats, Raritan, N. J., assignee by mesne assignments of John G. Dunham. Patented Dec. 18, 1860. Division B.

First, I claim the combination with a two-wheeled mowing machine having a laterally projecting cutting apparatus, hinged at its inner or heel end only, of an overhanging reel supported upon a single post

Second, The combination with a two-wheeled mowing machine having a hinged finger beam of an overhanging reel having two ribs or beaters only, whereby I am enabled to fold the finger beam up to the main frame without removing the reel.

DESIGNS.

2,671.—NAPKIN RING.—Francis J. Clamer, Philadelphia, Pa.

2,672.—STEAM FIRE ENGINE.—Benaiah Fitts (assignor to Gould Machine Company), Newark, N. J.

2,673.—PLATES OF A STOVE.—Isaac A. Sheppard, Philadelphia, Pa.

CORRECTION—ISSUED MAY 14, 1867.

64,741.—MELODEON.—Jonas Berger, Knoxville, Ill. (not Tenn.)

I claim, in the construction of an upright melodeon, arranging four swells and springs with the double reed boxes and bellows, and combining these with the double series of levers, as arranged, for operating the swells, substantially in the manner and for the purpose as herein set forth.

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NEW YORK STATE TRIAL OF BREECH-LOADERS.

REPORT OF EXAMINING BOARD.

The trials of breech-loading small arms during the past winter by the Board of Officers detailed by Governor Fenton excited great interest among military men and inventors. The latest improvements and inventions were exhibited to the board, the sessions of which were attended by the Russian, English, Spanish, and Danish officers sent to this country by their respective governments to examine breech-loaders.

Thirty days were occupied in the examination of seventeen arms, of systems adapted to conversion of muzzle-loaders, ten arms not so adapted, and three magazine or repeating guns. The tests were severe, but only such as would fairly represent the contingencies of actual service. A description of each arm is given, and a full record of its endurance under the several tests. The arms are divided into five distinct classes or systems, based upon the attachment and movement of the breech-block, as follows:

FIRST CLASS.—The breech-block hinged to front or rear of receiver, and moving in a plane parallel to the axis of the barrel, in which are included the Allin, Berdan, Hubbell, Joslyn's swing-breech, Lampson, Milbank and Montstorm, all adapted to conversion of muzzle-loaders.

SECOND CLASS.—The breech-block hinged to the left-hand side of receiver, and moving in a plane at right angles to the axis of the barrel, including the Empire No. 1 and the Joslyn's cap, both adapted to conversions.

THIRD CLASS.—The breech-block moving on a pivot at its rear end, and the forward end dropping in the receiver, below the chamber, for insertion of cartridge, including the Roberts, adapted to conversions, and the Peabody, intended for original arms.

FOURTH CLASS.—The breech-block pivoted at its lower front portion, near the front of receiver, and below the level of chamber; revolving in a vertical plane passing through axis of barrel, falling back to open the chamber and forward to close it, including the Miller, Poultney, Remington, and the Robertson and Simpson, all intended for original arms.

FIFTH CLASS.—The breech-block sliding in the receiver, either horizontally or vertically, including the Gray and the Meigs, both adapted to conversions, and the Ballard, National, and Sharps, intended for original arms.

In addition to which classification is the Empire No. 2, having no movable breech-block, the motion being in the barrel.

The magazine guns examined were the Ball's, Gray's, and Spencer's. The board arrives at twelve general conclusions or points, based upon its experiments, which may be briefly stated thus:

1. That arms in classes first and second may be objected to, as having too extensive movement of breech-block; and furthermore that it is an undecided question whether the hinge attachment is sufficiently stable.
2. That breech-blocks hinged as in classes first and second require an independent locking device.
3. That breech blocks hinged as in class second, on the left hand side, are awkward to manipulate.
4. That arms of the third class, having lever above the stock, are objectionable on account of constrained action in operating them.
5. That large sliding surfaces, as generally used in the fifth class, are objectionable on account of the friction, etc.
6. That any movement of the barrel, relative to the stock, is a source of weakness.
7. That extensive lever movement in any arm is objectionable.
8. That the retraction of the empty cartridge-case should be, by a positive motion, independent of springs.
9. That openings through the bottom of the receiver or the chamber are objectionable.
10. That the firing-pin should be strong and preferably in one piece.
11. That in the conversion of guns owned by the State, the reduction of caliber by reinforcement of the barrel is not advisable.
12. That the experiments thus far made are not sufficient to determine the result of the reduction in size of working parts by continued wear in service.

Of the arms presented to and tested by the board, it reports:

I. Of those adapted to conversion of muzzle-loaders, it deems the Allin, the Berdan and the Roberts as superior in all respects to any and all the others. But each of these arms, possessing distinctive features, more or less meritorious in themselves and in their combination, the board recommends a further and more extended competitive trial of these several arms, under such rigid regulations and requirements as the board may establish, to which regulations and requirements the several competitors shall consent and subscribe before entering their arms.

Of the remaining arms adapted to conversions the board would place in order of merit as follows: 4th, Joslyn's cap; 5th, Meigs'; 6th, Gray's; 7th, Milbank's, and 8th, Lampson's.

II. Of original guns not adapted to conversion the board report in order of merit: 1st, Remington's improved; 2d, Peabody's; 3d, Poultney's; 4th, The National; 5th, Robertson and Simpson's; 6th, Sharps; 7th, Ballard's, and 8th, Miller's.

III. In regard to magazine or repeating arms the Board is convinced that for the present their use should be confined to the cavalry service, as an examination of the record shows that single breech loaders are capable of being fired at least as many times per minute as a repeating arm, and are more simple in construction and less liable to derangement. In the cavalry service the proper management of the horse in action may render a repeating arm desirable as relieving the soldier from the embarrassment of loading in critical periods. The limited force of cavalry in the State service renders an immediate decision on this point unimportant, and the board recommends a delay in the selection and purchase of repeating arms, as several new inventions are now being perfected, and will soon be presented for trial and competition.

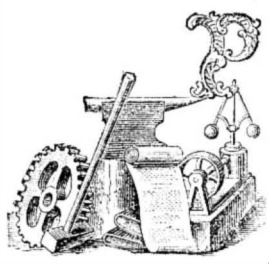
The board report in favor of "central fire" cartridges, the case to be made of brass and somewhat conical in form. More complete lubrication than is usual is particularly recommended. The Berdan cartridge is favorably mentioned.

The board will commence on July 9th next, the competative trials of systems for conversion of muzzle loading arms into practical breech-loaders.

Army and Navy Journal.

A New Island in the Pacific.

It is reported that a new island has been discovered in the North Pacific ocean, between 50 deg. west longitude, and 40 deg. 30 min. north latitude, twenty miles long. It is exactly in the track of vessels bound to this port from China and Japan. Fogs and misty weather prevail in that section of the Pacific. It is supposed that many missing vessels have been wrecked there. The discovery is considered of sufficient importance to justify the Government in dispatching a vessel to locate the exact position of the island. A company has been organized in San Francisco to survey the island, and they will send vessels this week to examine and take posession of it.



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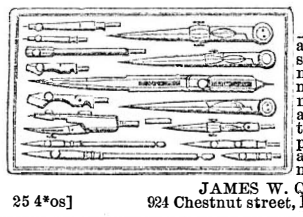

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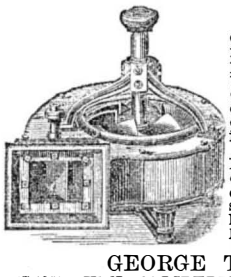

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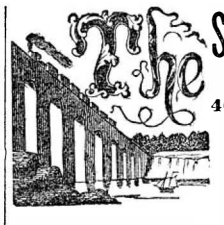

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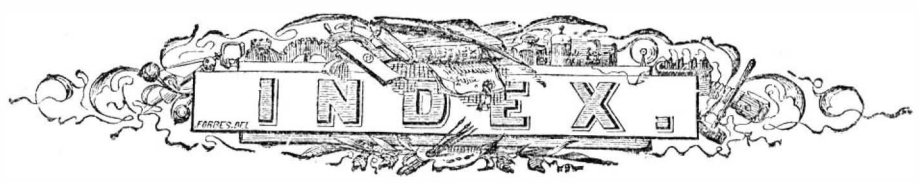

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